MARINE REVIEW.

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Facts About Lake Levels.

Secretary Keep of the Lake Carriers' Association sends the Review a summary of reports from government engineers that would seem to settle the water question. These reports show that during April the water on Lake Superior was 7.80 inches lower than in April, 1897, while on Lakes Michigan and Huron it was 7.20 inches higher than last year, and on Lake Erie 6.47 inches higher. The difference of about 8 inches on Lake Superior hardly warrants all that has been said about light-weight cargoes from the head of the lakes. Probably the difficulty at some of the shipping docks might be overcome by a little dredging. Mr. Keep's letter follows:

Editor Marine Review:—I send you herewith a little table in the form of a comparative statement of the lake levels for the month of April in 1897 and 1898. The information contained in this table was obtained from Maj. Sears, Capt. Zinn and Maj. Symons, of the United States engineer corps.

Lake.	Point of Observation.	Mean level, April, 1897.	Mean level, April, 1898.	Higher in 1898, inches.	Lower in 1898 inches,
Superior	Marquette..	+ .360	— .290	.....	7.80
Michigan and Huron	Milwaukee..	—4.840	—4.240	7.20	....
Erie	Erie.....	— .537	+ .002	6.47	....

The figures for Milwaukee show the level to be more than 4 feet below the plane of reference. In explanation of this it should be said that zero is the high water of 1838, and represents the highest point which the water has been known to reach. The high water mark of 1838 has not been approached since that year. The foregoing table practically explains itself, and shows that during the month of April, 1898, the water on Lake Superior was 7.80 inches lower than in April, 1897, while on Lakes Michigan and Huron it was 7.20 inches higher than last year, and on Lake Erie 6.47 inches higher. I think this table will be interesting on account of the exaggerated statements which have been seen in the papers this spring about low water in Lake Superior. Maj. Sears sent me with his figures an interesting letter, which you will be glad to publish in full.

Office of the Lake Carriers' Association, C. H. KEEP,
Buffalo, May 16, 1898. Secretary.

The letter from Mayor Clinton B. Sears, United States engineer in charge of Lake Superior Harbor improvements, to which Mr. Keep refers in the foregoing communication, is as follows.

Mr. C. H. Keep, Sec'y Lake Carriers' Association, Buffalo, N. Y.—Sir: I have your letter of May 9th, and in reply thereto submit the following, which has been prepared by my direction by Mr. J. H. Darling, United States assistant engineer:

In regard to the stage to water now prevailing on Lake Superior, the comparative figures submitted herewith are taken from the records of this office, and are based upon the daily gauge readings taken at Marquette, Mich. The mean level for April, 1898, was .29 feet below L. W. D.; for April, 1897, it was .36 feet above the same datum, and for the twenty-six years, from 1872 to 1897, which covers the entire period of observations at Marquette, the average of the April levels is .08 feet below datum. This makes the water last month .65 feet, or about 8 inches, lower than it was a year ago, and .21 feet, or 2½ inches, lower than the average for April during the last 26 years. So that the water is now nearly at its normal stage for this season. It may be further remarked that the stage of water last month (April) was 1.74 feet, or about 21 inches lower than when at its highest stage last year, namely, in August, 1897, (using the mean for each month, as before) and it is this difference which has probably impressed most persons who are engaged around the harbor, and has given rise to the exaggerated reports which have been current about the present stage. The water is always highest in the late summer or early fall, about September, and always lowest in the last of winter or early spring, about March or April, the average difference for the last 26 years between the lowest and highest being .92 feet, or about 11 inches. So there is reason to expect that the water will gradually rise from now on, and get to be about a foot higher later in the season, than now. We have had three or four successive years of unusually high water in Lake Superior, last year being one of them, and the fact that it is dropping back to its normal stage, or to two or three inches below the normal, need cause no alarm.

Daily gauge readings at Duluth harbor, which are also kept by this office, give the stage for April, 1898, .17 feet below L. W. D., and for April, 1897, .55 feet above the same datum, making the water here .72 feet, or about 8½ inches, lower than last year. This confirms within reasonable limits the Marquette record already given. The Marquette gauge better represents the lake taken as a whole.

United States Engineer Office, CLINTON, B. SEARS,
Duluth, May 13, 1898. Maj. Corps of Engineers, U. S. A.

Lieut. A. H. Scales and Ensign Geo. C. Day, the two naval officers who were assigned some time ago to branch hydrographic duty at Sault Ste Marie and Duluth respectively, have both been recalled for active war service. Lieut. Scales has been transferred to the Topeka, a cruiser of 1800 tons and 16 knots, recently purchased in England. The branch hydrographic office at the Sault is now in charge of Nautical Expert Creighton Churchill. At the Duluth office, No. 1001 Torrey building, Capt. Frank Henrich, a progressive young vessel-master who commanded the steamer Waverly last year, is in charge.

Contracts for different parts of the blast furnace plant to be erected by the Lorain Steel Co. are being closed up rapidly. It is expected that all the orders will have been placed within the next thirty days.

Large Contracts for Transportation of Coal.

About 600,000 tons of soft coal to be moved to ports at the head of Lake Superior has been covered by contracts at 20 cents a ton, and within the past few days several Lake Michigan contracts, mostly Milwaukee and Green Bay, have also been made. The rate on Lake Michigan coal is 25 cents, and in nearly all cases the contracts run to Nov. 1, but the Lake Superior business is shorter, some of it ending as early as Sept. 15. Several of the 20-cent Lake Superior contracts were made some time ago, but little has been said about them. While negotiations for the sale of Lake Michigan coal were under way, vessel owners seemed to be unanimous in declaring that they would not accept a 25-cent rate, but as in the past they took what was offered to them when the sales were effected. One of the first of the Lake Michigan contracts was made with the manager of a large Port Huron fleet, who took 50,000 tons of coal and a like amount of ore from Escanaba, the ore paying 50 cents a ton as an inducement in the double transaction.

These coal contracts will greatly increase the amount of tonnage tied up to regular business. There has never been a year when freight contracts have assumed anything like the volume of this year's engagements. With everything on a low basis, shippers of both coal and ore have covered their sales as fully as possible. A break in prices of Mesabi ores, which do not come within the scope of the association of ore dealers, has caused some large sales from that range, and a few additional ore freight contracts will probably be made as a result of these sales. Both shippers and vessel owners are of the opinion that the effect of all these contracts will be to restrict fluctuations in freights throughout the summer months and probably hold the market down to its present low basis.

Another Grain Shortage Case.

A decision in another grain shortage case at Duluth will interest vessel men. It was hoped that claims for grain shortages, which cannot be collected from consignees on account of the "cut-throat" bill of lading that is used in the trade on the lakes, might be recovered by proceedings at the point of shipment. Several cases of shortage are therefore dependent upon actions begun some time ago in the Minnesota courts. The present case is that of the Vega Steamship Co. against the Consolidated Elevator Co. and relates to a cargo of grain moved from Duluth to Buffalo in 1896. This case was also tried before Judge Moer. The court held that under the statute placing elevators under the control of the state grain commission, the weights as given by the state weigh-master are conclusive and binding on all parties, unless fraud or palpable lack of judgment is shown. If fraud is shown, or if the shortage is so great that a very apparent absence of judgment on the part of the weighmaster is evident, there is cause for action. In effect, the state weighmaster is an arbiter between the parties, and if they send grain through his hands they accept his services as arbiter, and they have no right to take exception to his acts. The only way out of this view, according to Judge Moer's findings, is the unconstitutionality of the law. If the law is unconstitutional in this respect there might be a cause of action. The only ground upon which its constitutionality may be attacked is that it deprives the parties of access to the courts. The question of constitutionality was raised, but Judge Moer upheld the law. He admitted that the question was a very close one, but he said that as a matter of public policy the law should be upheld. If it was not, there would be interminable litigation over shortages of various trifling amounts, and every farmer who was not satisfied with the weighing of a carload of grain might bring suit for a small shortage. Another factor in the question is the fact that the shipper has a man at the weighing who must make the same mistake as the weighmaster. There are also natural shortages in cargoes due to shrinkage. In a case against the Great Northern Elevator Co. recently Judge Moer held differently than in this case, and in making the present ruling he referred to that decision. He said that in that case the elevator is in another state and not subject to the laws of Minnesota. While the Superior elevators do business on the Duluth board of trade, the law regarding the matter cannot have extra-territorial effect.

Government has About Enough Auxiliary Naval Ships.

Although the naval auxiliary cruiser board, which has purchased a great number of colliers, transports, yachts, etc., for naval service, has been dissolved, several of the members of the board will assist Admiral Erben in the further selection of suitable vessels. In a dispatch sent out from New York recently, Admiral Erben gives warning that no decayed hulks are wanted. Serviceable transports and vessels suitable for coast patrol are still in demand. Capt. Frederich Rogers, who was president of the board, has been assigned to command of the cruiser Philadelphia, which will be made the flagship of the Pacific station. The steam yacht Dorothea of Philadelphia is among the latest vessels purchased by the government. A battery consisting of one 4-inch rifle and four 6-pounders will be mounted on this vessel.

Preparations are again being made in Milwaukee to have the little steamer H. A. Root take an expedition to Alpena for the purpose of recovering more copper from the wreck of the steamer Pewabic. The diving bell will be the same as was used last year.

Capt. C. M. Townsend, United States engineer in charge of the Grand Rapids district, succeeds Lieut. Col. King in charge of improvements of the upper Mississippi. Col. King's death was announced from Rock Island, Ill., Wednesday.

ALABAMA CLASS OF BATTLESHIPS.

FIRST OF THEM LAUNCHED AT THE WORKS OF THE CRAMPS, PHILADELPHIA—A FULL DESCRIPTION OF ONE OF OUR LATEST BIG VESSELS OF WAR.

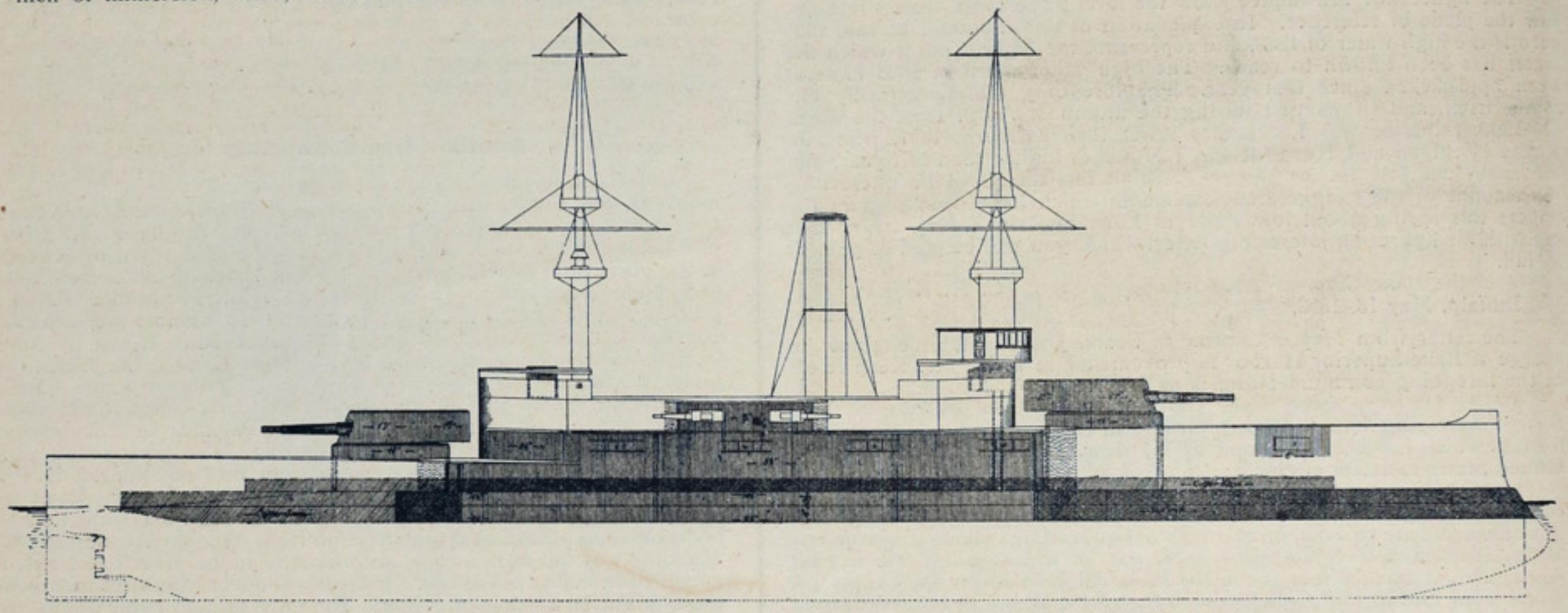
The battleship Alabama, to be launched today (18th) at the works of the Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, will be the largest battleship of the United States navy afloat, but of the same size and design as the Illinois and Wisconsin, which are being built at Newport News and San Francisco, respectively. In strength of battery, armor protection, and manœuvering power (due to moderate length), the vessels of the Alabama class compare most favorably with the best battleships of the world. As in all recent designs of battleships for the United States navy, a moderate speed only has been attempted in these vessels (16 knots), as it has generally been held in this country that the high speeds aimed at by some foreign navies were not desirable in battleships when obtained by sacrificing other and more essential qualities. For this reason, the designed speed of our recent battleships is more than a knot less than that required for some new foreign designs; but it is thought that this speed is still much greater than will ever be employed in fleet tactics, or the actual operations of war; in fact, the highest speed heretofore adopted in fleet tactics with battleships has rarely exceeded 12 knots. Principal dimensions and other particulars of the Alabama are:

Length on load water-line, 368 feet; length over all, 373 feet 9 inches; breadth moulded, 72 feet; breadth, extreme, 72 feet 2½ inches; freeboard forward, 20 feet; freeboard aft, 13 feet 3 inches; freeboard amidships, 19 feet 10 inches; mean draught with 800 tons coal, 2-3 stores and 2-3 ammunition, 23 feet 6 inches; corresponding displacement, 11,520 tons; speed per hour, in knots, 16; indicated horse power, 10,000; area of midship section, 1,613 square feet; area of load water plane, 19,900 square feet; tons per inch of immersion, 47.38; moment to alter trim, one inch, 923.65; wetted surface, 35,300 square feet; rudder area, 225 square feet; maximum helm angle, starboard, 35 degrees; maximum helm angle, port, 35 degrees, mean draught with all stores, provisions, and ammunition and 1,200 tons of coal on board, 24 feet 7 inches; corresponding displacement, 12,140 tons; metacentric height at 24 feet 7 inches draught, 4 feet 6 inches; range of stability at same, 65 degrees; maximum righting arm, 2 feet 6 inches; maximum righting moment, 30,350 foot-tons; angle of maximum righting arm, 35 degrees.

The main propelling engines are of the vertical, inverted cylinder, direct-acting, triple expansion type and are placed in two water-tight compartments separated by a middle-line bulkhead. Particulars of engines are: Collective I. H. P. of propelling, air-pump and circulating-pump engines, 10,000; number of revolutions for this I. H. P., 120; diameter of high-pressure cylinder, 33½ inches; diameter of intermediate cylinder, 51 inches; diameter of low-pressure cylinder, 78 inches; length of stroke, 48 inches; cooling surface of main condensers, 7,000 square feet; cooling surface of auxiliary condenser, 800 square feet. There are eight single-ended steel boilers of the horizontal-return fire-tube type, placed in four water-tight compartments. Particulars of boilers are: Length, 9 feet 11¼ inches; diameter, 15 feet 6½ inches; working pressure (lbs. per square inch), 180; total heating surface of all boilers, 21,200 square feet; total grate surface, 685 square feet; number of furnace flues, 4; diameter of flues, 39 inches.

The hull of this vessel is protected against injury at the water-line region by heavy tapered armor of a maximum thickness of 16½ inches, and extending from 3 feet 6 inches above to 4 feet below the normal load water-line. The maximum thickness is maintained for the entire length of the engine and boiler spaces. From the forward athwartship coal-bunker bulkhead the thickness is gradually reduced until it reaches 4 inches, which thickness is maintained to the bow. At the top of the belt, for the length of engine and boiler spaces, a flat protective deck 2¾ inches in thickness, worked in three layers, extends from side to side of the vessel, being tap-riveted to the upper edge of the side armor. Forward of the machinery space, however, the protective deck is turned down or inclined to the armor shelf level. Thus, any projectile passing through the vertical armor would, even if it were not broken up or deflected in its passage, have to encounter a sloping deck 3 inches in thickness. Abaft the heavy armor belt, the protective deck is worked in a similar manner to that described for the forward end of the ship, except that the slope plating is increased to 4 inches in thickness in order to afford greater protection to the steering gear. Where the protective deck is inclined at the sides, as above described, coffer-dams 3 feet in width and extending to the top of armor belt are provided, and packed with corn-pith cellulose, compressed to a density of 6 pounds per cubic foot. To provide as far as possible against the serious damage to boilers and engines, due to a raking fire from forward or aft, the opening between the flat deck and the sloping sides is, at each end of the machinery space, closed by diagonal armor bulkheads 12 inches in thickness.

From the top of the thick belt, extending to the main deck, the hull is further protected by a belt of light armor 5½ inches in thickness; this armor extends from barbette to barbette, ending in diagonal bulkheads in line with the 12-inch bulkheads below. Within the limits of this belt the broadside torpedo tubes are placed. Inboard if this 5½ inch armor, and extending well forward and aft, are worked coffer-dams 3 feet in width and 3 feet high, the top of the coffer-dams being 6½ feet above the load water-line. These coffer-dams are also filled with corn-pith cellulose. The side of ship between main and upper decks, and from forward barbette to a point just forward of the after turret, is protected by 5½-inch armor, with diagonal armor terminations, the forward one being worked immediately over the diagonal bulkhead of the deck beneath. Within this light redoubt are placed eight of the 6-inch rapid-fire guns. Thus, the central portion of the vessel is completely enclosed by a continuous wall of armor extending from 4 feet below the load water-line to the level of the upper deck, a distance of about 23 feet, and the walls of this redoubt are in no place less than 5½ inches in thickness. In addition to this very complete protection of the greater part of the 6-inch rapid-fire gun battery against the entry of smaller projectiles, the gun's crews are still further protected by 1½-inch splinter bulkheads worked between each pair of 6-inch guns, thus minimizing the effect of exploding shells, even though they should enter the armored redoubt. The other 6-inch gun positions, on the gun deck forward and on the upper deck amidships, are protected by armor 6 inches in thickness, that on the upper deck being turned in at the ends so as to afford protection against raking fire.



PLAN OF ARMOR ON OUR LATEST BATTLESHIP, THE ALABAMA, JUST LAUNCHED AT PHILADELPHIA.

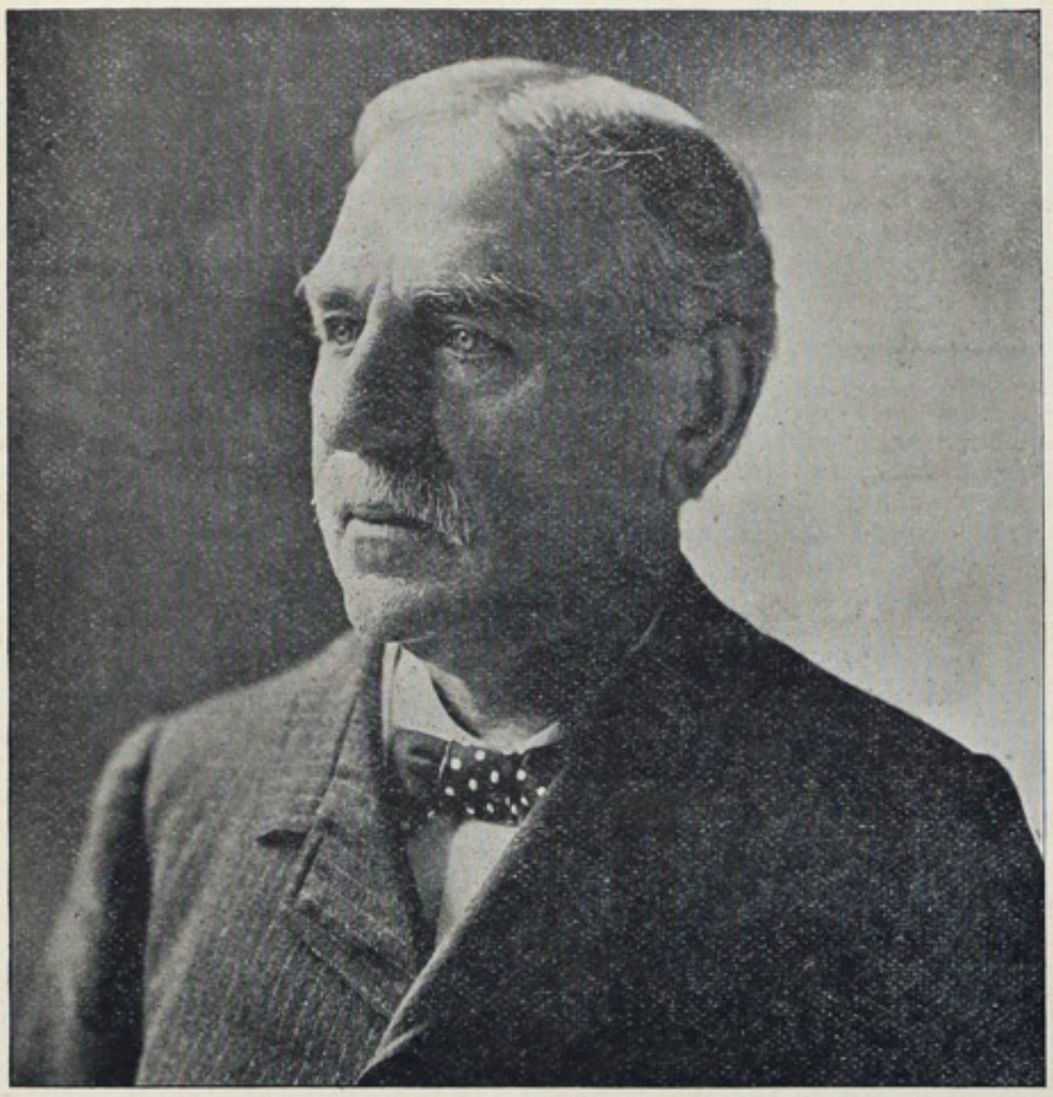
The conning tower is protected by armor 10 inches in thickness, being connected with a central station below the protective deck by a tube, the walls of which are 7 inches thick. In addition to the conning tower forward, these vessels are provided with an armored signal tower at the after end of the superstructure deck, the walls of this tower being 6 inches in thickness.

In the character and arrangement of the battery of the Alabama class, decided changes have been made from the designs of former ships of this type. The 8-inch battery has been entirely abandoned, and the calibers of the heavier guns reduced to two, namely, 13-inch and 6-inch. The main battery will consist of four 13-inch guns, mounted in pairs in turrets forward and aft on the midship line, and protected by armor 15 inches in thickness, with port plates 17 inches thick. The ammunition hoists and revolving gear of turrets are protected by barbettes 15 inches thick, except over the arc within the diagonal armor, where the barbette is reduced to a thickness of 10 inches to save weight. The turrets are oval in shape, with the front plates slightly inclined and the rear plates vertical, in order to give ample room for the handling of the guns and their loading appliances. The center of gravity of the revolving parts is in the axis of rotation, so that the turret is balanced and can thus be turned by its engine without serious retardation, even when the ship has a heavy list. The forward turret is at the level of the forecastle deck, the axis of the guns being 26 feet 6 inches above the normal load water-line; the after turret is on the main deck, the axis of the guns being 19 feet above the normal load water-line. Each pair of guns sweeps an arc of 135 degrees from the midship line. Three sighting hoods are provided for each turret, the one in the middle being for the turret turner, whose sole duty is to keep the guns pointed at the target, as far as their lateral direction is concerned. The hoods on each side are for the gun pointers. Between these 13-inch gun emplacements and within the armored casemate previously described, are eight 6-inch rapid-fire guns in broadside. These guns are capable of a total arc of train of 90 degrees, and are protected by 3-inch shields supported on the carriage, and the 5½-inch armor of the casemate. Each gun is separated from its neighbor by 1½-inch steel splinter bulkheads. Four more 6-inch rapid-fire guns—two one each side—are mounted on the upper deck, above this casemate; they are protected by 6 inches of armor, and are capable of firing fore and aft. On the gun deck forward is another pair of 6-inch guns protected by an armor plate 6 inches thick. The auxiliary battery consists of seventeen 6-pounders and six 1-pounder guns, mounted where practicable to obtain good command and yet be clear of the blast from, and interference with, with rest of the battery.

Four broadside torpedo tubes, protected by 5½ inches of armor, complete the armament. The weight of fire of one discharge (neglecting the auxiliary battery) from all the guns available on the Alabama will be 2,400 pounds ahead and astern and 5,100 pounds bow to quarter; for vessels of the Kentucky class the figures are 2,700 pounds and 5,750 pounds; Iowa class, 2,766 and 4,499; Indiana class, 3,400 and 5,600.

Senator Wm. P. Frye of Maine.

Senator Wm. P. Frye of Maine is known throughout the United States as the greatest advocate of American shipping. As a leading member of the commerce committee of the senate, he has for years given careful attention to every measure of a shipping nature that has come up in Washington. Heads of departments look to him for the direction of



legislation in which great care must be exercised. On the floor of the senate he is regarded as an authority on maritime affairs. Commercial bodies throughout the United States entertain for him the highest respect. This distinguished statesman undoubtedly contemplates with a great deal of satisfaction the revival of American shipping that seems certain to follow the present upbuilding of our navy. The restoration of the merchant marine to its old-time prestige has been his highest aim.

Cargo Records Lake Freight Ships.

The Chicago steamer W. R. Linn, owned by C. W. Elphicke and others, delivered at Owen Sound from South Chicago, a few days ago, a cargo of 232,000 bushels of corn, thus taking the record from Capt. Thomas Wilson's steamer Andrew Carnegie. The Linn now holds the record in both grain and iron ore. Her cargo of corn foots up 6,496 net tons, and is the largest cargo of any kind thus far moved on the lakes. The ore cargo which she carried from Escanaba to South Chicago recently—6,314 net tons—was not equal to her capacity, as there was not ore enough in the docks to give her a full load on the deep draught that is to be had at both Escanaba and South Chicago. Following is the corrected cargo list:

Iron ore—Steamer W. R. Linn, owned by C. W. Elphicke and others of Chicago, 5,638 tons gross, or 6,314 net, Escanaba to South Chicago; schooner Amazon, James Corrigan of Cleveland, 5,631 tons gross, or 6,307 net, Duluth to South Chicago, draft of 17 feet 1 inch; steamer Empire City, A. B. Wolvin of Duluth, 5,622 tons gross, or 6,296 net, Two Harbors to Cleveland, draft of 17 feet 2 inches.

Grain—Steamer W. R. Linn, C. W. Elphicke and others, Chicago, 232,000 bushels of corn, equal to 6,496 net tons, South Chicago to Owen Sound; steamer Andrew Carnegie, Wilson Transit Co. of Cleveland, 230,000 bushels of corn, equal to 6,440 net tons, South Chicago to Owen Sound; steel schooner Australia, James Corrigan of Cleveland, 210,539 bushels of wheat, equal to 6,316 net tons, Chicago to Buffalo; steamer Andrew Carnegie, Wilson Transit Co. of Cleveland, 332,100 bushels of oats, equal to 5,313 net tons, Manitowoc to Buffalo.

Coal—Schooner Polynesia, James Corrigan of Cleveland, 5,654 net tons of bituminous, Cleveland to Duluth, 16 feet draft; steamer Carnegie, Wilson Transit Co. of Cleveland, 5,369 net tons of bituminous, Cleveland to Duluth.

A tank steamer building for the Standard Oil Co. in Sunderland, England, will have a capacity of 2,000,000 gallons. This vessel, to be named Tuscarora, will be in service within a few weeks and will trade between New York, Philadelphia and ports in the United Kingdom.

A new ocean tug 100 feet long was launched at Madison, Md., a few days ago, by L. L. Brooks, and named the E. J. Codd. This tug is building for P. Weaver & Son, Baltimore.

A Summary of Traffic Conditions at Buffalo.

Buffalo, May 17.—I read within a week or so in some Buffalo paper of the falling off in grain receipts. Well, it must be that the writer had gone to sleep and fallen off himself, for receipts last week, with flour reckoned as grain, considerably exceeded 10,000,000 bushels. So much of the whole is wheat and flour that the valuation of the entire amount is usually considerably more than $1 a bushel. A modest estimate of the receipts of a single day last week of grain and its products was more than $3,000,000. The amount reported to the custom house today is 1,646,474 bushels of grain and 91,000 packages of flour. So we are not falling off very seriously yet. Rather the other way if anything.

It's a fact though, that nothing but grain is really doing much. Ore receipts at this port are slow. The ore will not come in much till the new Minnesota dock is done, which will be late this month. Then two large boats can be taken at once. Coal moves out moderately and may not increase right away. All shippers are merely sending to their agents. Nothing has been sold.

Lumbermen are so indifferent to lumber that they are about to use this condition to aid them in the fight over the control of the handling that appears to be about upon us. The lumbermen were not made a party to the agreement between the vessel owners and the union handlers, so they do not feel any obligation, especially as the arrangement violates a former agreement with the vessel owners to permit the dealers to appoint their own stevedores. Though the barge owners are justified in trying to place their business on a paying basis, the dealers are not to be expected to permit a return to the old days of strike and turmoil that were driven out by the present handling arrangement. So they have this week issued a circular defining their position.

At this writing the canal is still at a standstill. In spite of the most favorable spring for work ever known, the feeding in of the water has caused constant leaking and breaking of the banks. This with the discovery of so much looseness in the improvement contract work may well cause the party of Gov. Black to think seriously of dropping him this fall and running Gen. Woodford. It would be a big undertaking to reelect him as things look now, not to mention party politics at all.

There is less in the package-freight traffic than usual. The all-rail lines have done their worst to cut all profit out of the east-bound business, and a few lake-and-rail lines, of which the new Canada Atlantic seems to be the worst, have reduced west-bound rates to a mere nothing. It would seem that national wars may come and go, but freight wars never end. West-bound business is very light.

The elevators are still dangling between Heaven and earth with the big new houses indifferent to the question of a combine, one at least of the older big ones, the Kellogg, fighting hard against the proposed basis of union, and all the canal houses left out in the cold, as they are comparatively helpless. So the terrible tale of Buffalo handling extortion is not to be retold unless there is a change of the harmonious sort brought about. Buffalo has her grievances and perplexities, but is in the swim for all that. The season will be a very big one as to handlings. As to earnings that is different.

J. C.

Ships Building for Japan.

Japan has for two years past been furnishing the ship yards of England, France, Germany and the United States with a great deal of work. Following are some particulars of ships for Japan now under construction:

In England: Three ironclad battleships—One at Thames Iron Works of 15,188 tons displacement and 18 knots speed; one at Thompson's of 15,400 tons and 18 knots; one at Armstrong's, 15,140 tons and 18 knots. Three armored first-class cruisers—all at the works of Armstrong & Co.; two of 9,855 tons and 21½ knots each, and one of 9,906 tons and 20¾ knots. Besides these large vessels eight torpedo boat catchers of 31 knots and 316 tons displacement, are ordered from England.

In France: One armored first-class cruiser of 9,460 tons and 20 knots, and one armored second-class cruiser of 4,227 tons and 22½ knots.

In Germany: One armored first-class cruiser (Yakumo) of 9,800 tons displacement and 20 knots speed, at works of Vulcan company.

In the United States: Two armored second-class cruisers; one at Cramp's works (Kasagi) of 4,980 tons and 22½ knots speed, and the other (Chitose) at Union Iron Works, San Francisco, of 4,840 tons and 22½ knots.

For the mercantile marine of Japan there are building in England twelve vessels, nine of which are on orders from the Nippon Yusen Kaisha and three on orders from the Oriental Steamship Co. The aggregate tonnage of these vessels, all of which are to be finished before the end of this year, is 42,300 tons. Four of them are of about 6,000 tons each, three of 3,500 tons each, two of 2,500 tons each, and three of 1,000 tons each.

Nearly Four Hundred Millions Spent on the New Navy.

"Fifteen years ago we had not a modern gun afloat in the navy of the United States," says Chairman Boutelle of the house naval committee. "We had no facilities whatever for the manufacture of armor. In fifteen years, while we have not done all that ought to have been done in that direction, we have at least accomplished some notable work. The total appropriations for the naval service during the past fifteen years have amounted to $387,987,840, of which nearly 50 per cent. has been appropriated during the past five years. In fifteen years we have increased the authorization of vessels for the new navy, including those in the present bill, by 258,014 tons, and of that amount nearly 51 per cent. has been authorized within the past three years. The increase in the armament of the navy has been such that at present our ships are capable of throwing at every discharge of their guns 122,260 pounds of metal, and of that amount the ships that have been authorized by the committee during the past five years have put afloat, and will put afloat, guns capable of throwing 63,928 pounds of all round fire at every discharge, or more than one-half the capacity of the navy. A similar good showing is made regarding the construction of the 114 ships during the past five years and of the building of battle ships and of torpedo boats."

Before the Japanese-Chinese war Japan had only 160,000 tons of steam merchant vessels. Now she has 400,000 tons.

A LOCK-WIDENED ERIE CANAL.*

ARGUMENT BY G. H. RAYMOND OF BUFFALO AGAINST THE SHIP-CANAL SCHEME AND IN SUPPORT OF A WATER-WAY SUITED TO 600-TON BARGES.

One of the most important business propositions in this country today is the cheap movement of breadstuffs from the west to the sea. We may safely admit that the question of greatest economy in moving breadstuffs from the west to Buffalo has been solved by the modern lake carrier, the latest type of which carries about 7,000 net tons. The problem remaining to be solved is the cheapest plan of moving to the seaboard from Buffalo the great volume of freight delivered at the latter point from lake vessels. Many plans have been submitted, all of which have good features, to be sure, but it will be sought in this paper to discuss the matter in a homely way and stripped of figures unnecessary at this time. The aim will be to prove that the Erie canal, with the present improvements completed, and one tier of locks simply widened 6 feet and the prism straightened, on one side, where necessary, solves the problem beyond question and furnishes the cheapest possible freight route from Buffalo to the sea, and at the same time at a cost not exceeding 5 per cent of the estimates for ship-canals.

Plans for ship-canals call for $200,000,000 to $500,000,000 for construction. The greatest problems in engineering and in water supply must be met. Years would be consumed in building a ship-canal and likely some years in making proper surveys before its practicability could be decided. To make a canal large enough to accommodate the present ocean freighters of 12,000 tons, having 33 feet loaded draft, would exceed the highest estimate noted. This canal would also require the lake channels and harbors to be made practically twice as deep as they are today, which would cost as much, if not more, than the total cost of the canal, and after all such a canal is probably a physical impossibility. If a ship-canal is made to accommodate present lake craft, requiring, of course, trans-shipment at New York to ocean craft, the lock-widened Erie canal would do the work more economically, and if a canal was built for lake vessels it would not be used by them but by the 600 ton boats adapted for the lock-widened Erie canal. Lake craft could not compete between Buffalo and New York with Buffalo transfer saved, with the cheaper constructed, cheaper handled and more expeditiously handled boats adapted to the lock-widened Erie.

The canal boat of today carries 240 tons. This is based on a length of 98 feet, a beam of 17 feet 10 inches and 6 feet draft of water. The pending improvements of the Erie canal will give an increased depth suited to boats of 8 feet draught. If, then, one side of one tier of locks throughout the Erie canal was simply taken down, set back 6 feet and again put up, with practically the same stone, it would be possible to have boats 115 feet long, 23 feet 10 inches beam and 8 feet draught. In many places it would be necessary to straighten the prism on one side of the canal. Such a boat could carry 600 tons as against 240 tons in the boats of today. Five such boats would be towed by a steamer, which would push one and pull four, making three pairs, each pair steered by one man, as is now done with the smaller boats. Larger engines but no more men would be required. The trip from Buffalo to New York would be made in about seven days. It would be possible to unload this fleet at New York and put on its up cargo in twenty-four hours. As good dispatch would be given at Buffalo, or better. Two round trips could be made in about a month. To be very safe, say three round trips could be made in two months. The actual cost for fuel, labor, oil, waste, etc., for a six-boat fleet would not exceed $1,200 per month; to be very safe, $1,500 per month.

With five boats of 600 tons each and the tow-steamer of 450 tons we have 3,450 tons carried on each down trip. Admit that 20 per cent. less cargo is carried on the return trip and we have 6,090 tons for the entire distance between Buffalo and New York. Taking this again at 6,000 tons and figuring on one and one-half trips per month we have 9,000 tons carried 500 miles for not to exceed $1,500. This gives a rate of less than 18 cents per ton from Buffalo to New York. To guard against all contingencies, let us double this rate, making it 36 cents per ton, which would admit of using twice as much time or taking half the tonnage. This means practically one cent per bushel on wheat from Buffalo to New York. Such a rate means the greatest commercial revolution known in a generation and absolutely places New York above and beyond any competition from any Atlantic coast port seeking import or export traffic.

Assuming that New York state will complete the pending canal improvement what would be the additional cost for this work? At the request of the author, Congressman Mahany introduced a bill at Washington which, through the war department, secured a competent estimate of the cost of lock widening. Maj. T. W. Symons reported to the war department that the cost of widening one tier of locks throughout the entire length of the Erie canal, omitting Lockport and Cohoes, would be a little less than $2,500,000. The prism on one side of the canal should be straightened in many places and, while figures are not attainable at this time, it may be safe to assume that $5,000,000 would be the cost of this work. While it might be deferred, it would be very desirable to have the canal changed from Newark to Syracuse and thus secure a better water supply from Lake Erie. If land saved in Syracuse were sold, the additional cost would not exceed probably $2,500,000. This gives $10,000,000; to be very safe, say $15,000,000. Therefore, for a price less than 5 per cent. of any ship-canal estimate thus far made, we have the cheapest possible means of moving the entire products of the west to the sea from Buffalo. There are no engineering problems to solve and apparently no complications will arise. Later, if desired, the depth could be increased, but all would be done taking the present canal as a basis. The all-important feature of this suggestion is that the entire system of locks could be made available for the larger boats in a single winter and the benefits secured immediately.

The weakness of all ship-canal projects, even for vessels of the lake type, is at once apparent when the question of economy, viewed from a commercial standpoint, is taken into account. Grain cargoes in lake vessels must be transferred at New York to ocean craft. The only saving would be the transfer at Buffalo. It is safe to say that with such a traffic at Buffalo as the barge canal would bring transfer rates would readily be lowered. However, if they were not lowered a particle a ship-canal for lake vessels would still not be able to compete at all with the 600-ton boats taking freight transferred at Buffalo from lake craft. Shipments of 7,000 tons of grain from the west for a single foreign port would not be made once in ten years, if ever. Hence the lake vessel would have to make as many deliveries at New York as it had consignees. Judging from conditions at Buffalo, such a vessel would have to make four to six deliveries in New York. It is obvious that a 7,000-ton vessel could not go from one dock to another in New York to discharge. It would be practically impossible to make such direct transfers. If it were possible to make such transfers, the tow bills for five deliveries would aggregate one-half the freight that it would paid on 600-ton barges from Buffalo to New York. The natural delays in discharging such a cargo at New York, which do not exist at Buffalo, would be sufficient to enable a vessel to steam from Buffalo to Chicago. The result would be that the lake craft would be unloaded into barges by a floating elevator, these barges towed alongside the ocean craft and the barges unloaded by a second floating elevator into the ocean craft. The expense of this extra transfer alone, judging from present elevator rates in New York, would be more than the entire freight from Buffalo to New York in 600-ton barges. On no account can the ship-canal for ocean or lake craft be considered in the matter of economy. In taking its up cargo the lake vessel could not go to the various docks to get it as it comes in small lots. Its cargo would have to be lightered to it. The present rates of lighterage in New York are twice the rates at which 600-ton boats could profitably move the stuff from New York to Buffalo. The delay in taking cargo into the lake vessels at New York would be equal to the time required for a round trip from Chicago to Buffalo.

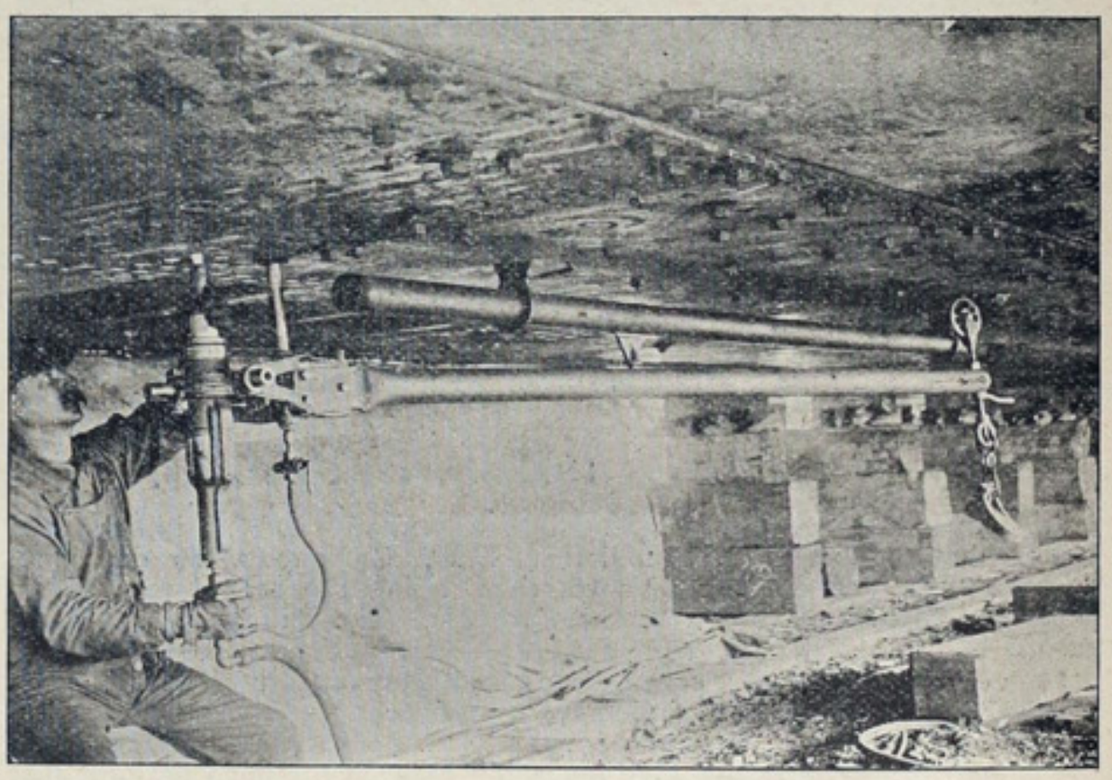
All things considered, the lock-widened Erie canal furnishes the best and the only feasible plan and apparently accomplishes the greatest economy in transportation. This paper is submitted as a business man's idea of the case, and it is hoped there is yet sufficient state pride to make New York, through the lock-widened Erie canal, again the peer of any port on the Atlantic coast.

*Paper prepared by G. H. Raymond of Buffalo for a meeting of the American Society of Civil Engineers.

Riveting Machines at Chicago.

The accompanying illustration shows the Babcock-Gunnell patent shell riveter in operation driving ⅞-inch rivets in the bottom of the steel tow barge building at the works of the Chicago Ship Building Co. for the Minnesota Iron Co. Several of these machines in use at Chicago have been built entirely at the ship yard. A correspondent who is fully informed regarding the work of these tools says:

"One of the men at the ship yard on Tuesday drove 340 ⅞-inch rivets, which at the regular rate for hand riveting would have cost $11.90, whereas



the actual cost was $5 for the gang and perhaps 50 cents for the power, or at the outside less than $6, practically cutting the cost of the riveting in two. There are now five of these machines in operation here, and although the riveters have been out on a strike for over four weeks, on account of the putting to work of the first one, the company has driven many thousands of rivets with the machines and are still going ahead as usual. The steamer Manola was here last week for a new sheerstrake plate and the riveting was done entirely by two of these machines, and the boat got away in less than twenty-four hours from the time she reached the yard, although there was not a hand riveter in the place."

The photograph shows quite plainly the construction and operation of the machine. The riveter consists of a pneumatic hammer mounted in gimbals on the end of a piece of pipe about 8 or 9 feet long, which pipe is hung by its center to a trolley running inside of another piece of pipe which is bolted to the bottom of the ship. This allows the hammer to be brought to any point in a considerable space of the ship's bottom without shifting. The mounting of the hammer in gimbals allows it to be swung in any direction, so as to get at the rivet from all sides exactly as in hand riveting. The small cylinder shown with the air pipe connected to it close to the hammer is only to hold the machine steady when required, the piston rod being jammed up against the bottom of the ship and carrying a piece of rubber at its top end to prevent slipping.

To Oak Point beach and other pleasure resorts on the Nickel Plate road—Outing parties of twenty-five or more may secure very low rates to Oak Point beach and other resorts on the Nickel Plate road. Apply to any agent of the company, or address B. F. Horner, general passenger agent, Cleveland, O. 53—June 30

Charles H. Cramp Talks of the Ships for Russia.

"One of the most important results of the war with Spain," said Charles H. Cramp upon arriving in New York on the steamer Majestic, a few days ago, "will be a genuine and profitable interest in the American merchant marine." Mr. Cramp talked very freely of the ships that are to be built by his company for Russia. He said:

"In building these two vessels—a battleship of 12,500 tons and an armored cruiser of 6,000 tons—we intend to accomplish two things never before attempted. First of all we mean to break all records both as to the time of construction and speed. The battleship, according to the terms of the contract, must be able to make 18 knots an hour in actual service. The armored cruiser must and will travel through the water at the rate of 23 knots an hour. We furnished the plans and specifications for these two ships. These plans were drawn with special reference to what is known among naval experts as 'sea keeping power,' which is simply another name for steaming radius. I am not at liberty to go into the details of construction at this time, but I will say that the new ships will be able to steam from St. Petersburg to Port Arthur in China without recoaling. This is necessary for the reason that the coaling stations of the Russian navy are not as numerous as those of the other great powers. As a natural sequence Russia's ships require a larger coal carrying capacity. The test of the vessels will be of twelve hours' duration, they being loaded to correspond with their sea trim when in actual service. The battleship will carry a heavy armament consisting of four 12-inch guns and four 6-inch rapid-fire guns. The cruiser will be provided with twelve 6-inch rapid-fire guns. She will in a general way compare with the United States cruiser Brooklyn. The construction of these vessels will in no way interfere with the work we are now doing for the United States government. Our yards are large enough to accommodate all the work we now have in hand."

It is understood that the Russian government will build on the Neva three first-class battleships to displace 12,675 tons each, and that other orders will be placed in France and Germany.

Calling for Bids on the New Ships.

The Naval Board of Construction has hurried preparations for the building of ships provided for in the naval appropriation bill, and circulars calling for bids on most of the vessels are now in the hands of builders. The contracts, which will be entered into as rapidly as possible, will be for three first-class battleships, sixteen torpedo boat destroyers, twelve torpedo boats and four harbor defense monitors. The battleships will be of the Alabama type, but faster. The Alabama is fully described in this issue of the Review. The torpedo boat destroyers must have a minimum speed of 28 knots and be able to cruise 2,000 miles without refilling bunkers. The speed of the torpedo boats is to be 26 knots.

On account of the small appropriation made by congress for the monitors—$1,250,000 each—it has been determined to limit their size to 2,500 tons displacement and to supply each ship with only one turret, to be placed in the forward part of the vessel. They will probably have twin engines and water-tube boilers, and will be capable of making about 12 knots. It has not yet been definitely decided whether to equip them with two 12-inch or two 10-inch breech-loading rifles. The superstructure of the vessels will be constructed so as to reach from the turret nearly to the stern of the ship, and rapid-fire guns will be placed on this to be directed against any torpedo boats that may attempt to attack the ships. The turret will be so arranged that the guns can be trained over an arc of at least 300 degrees, so that they can be fired in almost any direction except dead astern. These vessels will not be as efficient as the double-turreted monitors, but they will be very effective harbor defense ships, and the department proposes to make them as good as possible with the money given by congress. They will probably require two years to build.

Ohio Coal Railways.

The following is from one of the Wall street journals that profess a knowledge of financial affairs:

"The Cleveland, Lorain & Wheeling road is at present showing an improvement in earnings, but there is no prospect of early dividends being resumed. Like all Ohio bituminous coal roads, it has suffered from hard times and mining troubles. Now, however, mining troubles are all practically settled, times have improved and the road is doing better. The next move, we anticipate, will be to include this road in the great bituminous coal road pool now being organized by J. P. Morgan & Co., which means that the Cleveland, Lorain & Wheeling, Columbus, Hocking Valley & Toledo, Wheeling & Lake Erie, Columbus, Sandusky & Hocking, Toledo & Ohio Central, and in fact nearly all Ohio coal roads will be consolidated under one management, with the Baltimore & Ohio or Vanderbilt lines for an outlet to tide-water. This deal will soon be brought about and is already well under way. The result promises to be a large saving in operating expenses to all these roads and consequently more for the stockholders."

Referring to the action of the so-called independent mine owners of Minnesota in petitioning the state railroad commissioners to reduce freight rates on ore, Mr. H. H. Porter of the Minnesota Iron Co. says: "The first effect of this move will be the cancelling of plans for $300,000 worth of Duluth & Iron Range improvements that had been laid out. If I had known sixty days ago that the complaint was to have been made to the railroad and warehouse commission for the reduction in rates, I should have had time to cut off about $300,000 worth of other improvements. I know of nothing that will tend to injure this immediate section more than will this attempt to reduce rates. I never yet knew of a reduction of rates for transportation that did not reduce the price of the commodity at the point of consumption. The buyer always gets the entire benefit of cut rates, and generally a little more. The independent miner will not be benefited to the extent of a single dollar, but the buyer of the ore will be benefited to the extent of every cent that might be taken from the cost of transportation."

Around the Lakes.

Capt. James Rooney of Toledo has sold the tug Wisconsin to E. C. Williams of Marquette for $7,000.

James Morrison, well known vesselman of Detroit, died Monday. He was seventy-four years of age.

Wages of ore dock men at Ashland have been raised from $1.35 to $1.50 for day work and from $1.45 to $1.60 for night work, with 20 cents an hour for over time.

Daily steamboat service between Detroit and Cleveland is now provided by the Detroit & Cleveland Navigation Co. At Detroit the time of departure is 10:30 p. m., and at Cleveland 10:15 p. m.

Manitowoc city officials have granted all concessions asked by the Northern Grain Co. and it is now said that a grain elevator of 1,500,000 bushels capacity will be built at that point at once.

The new Mineral Range coal dock at Houghton will be in readiness to take coal about June 1. This dock will be modern in every way and will greatly facilitate the handling of coal in the Portage district.

"Touring Northward" is the title of a gem in advertising just issued from the passenger department of the Lake Michigan & Lake Superior Transportation Co., Chicago. It deals with attractions of the steamship Manitou and her trips to the charming summer resorts of northern Michigan.

Assistant Secretary Spaulding of the treasury department, has reduced to $2 the fine of $50 imposed by the Detroit collector on the barge Fostoria for failure to surrender her license. The fine of $50 imposed on the steamer Bob Stevenson, at Marquette, for the same offense, was reduced to $10.

Vessel men of Buffalo whose names were connected with the McFall insurance companies, operated on the Lloyd's plan, will very probably be called upon to pay claims that are held against the defunct companies. Attorney R. M. Lee of Cleveland secured judgment against several of them a few days ago on a cargo certificate. In this case the several principals of the insurance companies were sued as partners.

The three remaining tugs of the old Vessel Owners' Towing Co. were sold at a receiver's sale in Chicago, Saturday. Receiver James Higgie conducted the sale on board the boats. The tugs Satisfaction and Blackball were bid in by Attorney Brice at $425 and $450 each, while Ed. Napier bought the M. Shields at $430. The Shields will be used in the new Chicago lighterage line. It is supposed that Attorney Brice bought the two boats for other parties, and the disposition of the boats is not known.

C. F. Stuart of Stuart & Co., Cleveland, J. T. Jones and others have leased what will be known as the Vulcan Silica mine, located near Vulcan on the Menominee range. The property is a high bluff practically without cover, standing at an angle of 80 degrees. A branch track will skirt this bluff at its base. The ore will be guaranteed 40 per cent in iron, 41 per cent silica, .017 per cent phosphorus, .75 per cent alumina, moisture not to exceed 2 per cent and probably 1 per cent. The amount of ore in sight is large, the cost of ore is low. The ore will be thrown down in blasts and loaded with a steam shovel. Shipments are expected to begin in a few weeks.

The sinking of a part of the United States revenue cutter Gresham at Ogdensburg, Tuesday, while on her way from the lakes to the coast to enter the naval service, will undoubtedly be investigated by the treasury department, although it would seem that the loss will fall on the contractors who agreed to deliver the vessel ready for sea at Montreal. The work of cutting the cutter in two and bulkheading the parts for the voyage down the St. Lawrence had been completed and tugs were about to take her in tow when the forward section, 48 feet in length, was found to be filled with water and soon sank to the bottom. Only a few plates show on the starboard side. Fourteen men were thrown into the water, but all escaped. The sunken part of the vessel is in an awkward position and the wrecking job will be quite difficult.

Armored Cruisers are Badly Needed.

Beyond all doubt the most pressing need of the navy is the addition of more Brooklyns and New Yorks to its fighting line. The fact that Spain has a fleet of 20-knot, heavily armed and armored cruisers at sea, threatening to strike at one of half a dozen important points, and capable, after striking a blow, of escaping by virtue of its superior speed from our powerful battleships and monitors, emphasizes the value of this type of vessel both for offense and defense. For it is evident that the proper safeguard against a fleet of armored cruisers is a fleet of the same kind, having the same combinations of high speed, powerful guns and good protection. At present we have only the Brooklyn and the New York. If we had but twice this number, we could dispatch the quartet against the Cape Verde fleet, with the certainty that they could catch and destroy it. But, as matters stand, we have no two armored ships with sufficient speed to enable them to cruise in company with the Brooklyn and New York and join with them in a full speed pursuit of the enemy.

In the United States navy there are now built, building or authorized thirteen battleships and ten monitors, making a total of twenty-three heavily armored vessels. If any general criticism can be made of this, our first line of defense, it is that it lacks in mobility—that while it is admirable for defense, it is not capable of those swift movements which at a critical time may turn the fortunes of a campaign. The addition of two or three 20-knot armored ships, however, would remove this defect and render us capable of making a swift concentration of powerful ships at any desired point, either for attack or defense. Such a fleet distributed among our seacoast cities and capable of quick assembling would effectually dispose of the bugbear of bombardment by the enemy. It is unfortunate, therefore, that the present naval appropriation bill contains no provision for ships of this kind.—Scientific American.

A favorable report on the naval personnel bill will be made to the house shortly by the committee on naval affairs, but the bill has little chance of being enacted into a law; even those who favor it concede this.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

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The books of the United States treasury department on June 30, 1897, contained the names of 3,230 vessels, of 1,410,102.60 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1897, was 399, and their aggregate gross tonnage 769,366.68; the number of vessels of this class owned in all other parts of the country on the same date was 314, and their tonnage 685,709.07, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1897, was as follows.

	Number.	Gross Tonnage.
Steam vessels	1,775	717,235.45
Sailing vessels and barges	1,094	694,888.87
Canal boats	361	37,978.28
Total	3,230	1,410,102.60

The gross registered tonnage of the vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1893	175	99,271.24
" " " 1894	106	41,984.61
" " " 1895	93	36,352.70
" " " 1896	117	108,782.38
" " " 1897	120	116,936.98
Total	611	403,327.91

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canals.			Suez Canal.		
	1897	1896	1895	1897	1896	1895
Number of vessel passages	17,171	18,615	17,956	2,986	3,409	3,434
Tonnage, net registered	17,619,933	17,249,418	16,806,781	7,899,374	8,560,284	8,448,383
Days of navigation	234	232	231	365	365	365

The so-called independent mine owners of Minnesota who are fighting the Rockefeller interests and the Minnesota Iron Co. for a reduction in freight rates over the railroads controlled by the two big concerns—Duluth, Mesaba & Northern and Duluth & Iron Range—seem to have the newspapers of the state with them in the contest before the state railroad and warehouse commission. The independent producers have petitioned the commission to reduce the maximum rate to 40 cents. The highest rate charged now is $1 a ton, from Tower and Ely to Two Harbors, and the uniform rate from all Mesaba range points to Duluth, Two Harbors or Allouez bay is 80 cents a ton. The reduction asked from Mesaba range points is 50 per cent, and from the Vermilion range 63 per cent. The petitioners declare that there is a concerted effort to freeze out all independent companies. They allege that the rates charged them for ore transportation are "grossly unjust, unreasonable, and offensive, and were fixed at a time when ores were worth about twice their present value, and the profits of mining several times as great as they now are." They further hold that these rates yield a profit so unreasonably great that the persons or corporations, substantially combining in one ownership the railroad and mines tributary thereto, can afford to operate their mines without profit, or even at a loss, the profits derived by them from the transportation service being ample for both the mining and the transportation, and that in fact such conditions have to a considerable extent prevailed upon the ranges during several years as to make it practically impossible for mines or miners not interested in the railroad corporations to carry on a mining business.

Instructions have been sent to the Wm. Cramp & Sons Ship & Engine Building Co. by R. A. C. Smith of New York, president of the American Mail Steamship Co., ordering that the first of the four twin-screw steamships now in course of construction at the Philadelphia yard be christened Admiral Dewey. As these vessels are the first American vessels of their class built under the Act of March 3, 1891, and are to be especially adapted for use in the auxiliary navy, Mr. Smith has determined to name the four vessels now building, and others that are in contemplation, after famous admirals in the United States navy. The Cramps are under contract to deliver the Admiral Dewey August 15, and the three sister ships will be launched at dates not yet fixed during the succeeding month.

Another of the North German Lloyd company's new Atlantic liners, the Kaiser Friedrich, is about due in New York on her maiden voyage. This steamship was built at the Schichau yards at Elbing and is the second ship afloat as regards size, being 12,800 tons, with a horse power of 25,000. Her length, breadth and depth are 600 feet, 64 feet and 41 feet respectively. She has accommodations for 1,400 passengers. A particular interest is felt in the speed of the Kaiser Friedrich. Her builders, anxious that she should more than do them justice, wanted the company to contract for a vessel of 25 knots. This, however, the North German Lloyd for many reasons could not agree to, and so she was ordered, like the Kaiser Wilhelm der Grosse, for 22½ knots.

According to the twelfth issue of "Brassey's Naval Annual," just published, England has twenty-nine first-class battleships built and nine building, compared with fourteen owned by France and six building, Russia having half a dozen in each stage. Of second-class battleships England has seven, and of third-class twenty, with none building in either class. France has eight second-class built and one building, and seven third-class with none building; Russia, when she has completed one second-class ship now building, will have five of the type; of the third-class she has five, none building. Thus of battleships England has sixty-five, nine building, against France thirty-six, seven building, and Russia twenty-two, seven building. Of the three classes of cruisers, England has one hundred and thirty-one, twenty-seven building, compared with France's forty-nine, nineteen building, and Russia's fourteen, four building.

The introduction of the following resolution in the senate, a few days ago, by Mr. Chandler of New Hampshire is an indication of what may be expected from the United States, now that the war has created a national interest in naval affairs: "That the committee on naval affairs be directed to make inquiry concerning the expediency of securing and establishing for the United States additional coaling stations at suitable points in foreign waters; and as to each coaling station which may be deemed necessary to ascertain what should be its dimensions, the conditions and expenses of occupancy, and maintenance, and the best method of securing the right to maintain such station, and report by bill or otherwise."

Marine underwriters in New York who have for several weeks past been trying to form an association for the maintenance of rates, under the name Institute of American Marine Underwriters, have not as yet agreed upon a plan of organization. At a meeting held a few days ago it was decided to give the committee on organization another fortnight in which to complete a report. The effort to form this association is due largely to protests made against rate cutting in this country when annual meetings of the big Liverpool and London companies were held about the first of the year.

It is said that officials of the Oliver Iron Mining Co. had considerable to do with the recent reduction in rail rates on ore from Gogebic range mines. Their Norrie mine and other properties supplying ore to Carnegie furnaces are, of course, a big factor in the tonnage of old range ores, probably so large that they would be prompted to build another railway in the Lake Superior region. They are said to have intimated to the management of the Northwestern road that a railway would be built if an arbitrary policy was pursued regarding rates.

The degree of completion on May 1 of vessels under construction for the United States Navy is as follows: Battleships—Kearsarge, 58 per cent.; Kentucky, 58; Illinois, 45; Alabama, 50; Wisconsin, 36. Gunboat—Princeton, 97 per cent. Torpedo boats—Rowan, 97 per cent.; Dahlgren, 60; T. A. M. Craven, 40; Farragut, 70; Davis, 86; Fox, 79; Mackenzie, 98; Stringham, 25; Goldsborough, 4; Bailey, 2. Submarine torpedo boat—Plunger, 70 per cent.

The navy department seems to be figuring on having use for light-draft transports, probably for river service of some kind. Two or three Pittsburg firms that are engaged in steel and iron structural work have been asked to bid on five such vessels, to cost about $250,000. The boats are to be of steel, 172 feet long, 36 feet beam and 6 feet deep, and to be finished complete with cabins, all machinery and electric light plants.

In returning to this country on the Cunard line steamer Etruria, Capt. Alfred T. Mahan, U. S. N., retired, is reported to have disguised himself by shaving and assuming the name of A. T. Maitland to escape recognition on the vessel. Capt Mahan left in March for an extended trip in Europe. He returned in answer to a summons from the government that he was needed in Washington.

It is surprising that the navy department has succeeded in getting any additional ships into commission under the pressure of other work that has been going on, but the navy yards are doing very well in this regard. The cruiser Newark at the Norfolk navy yard will be entirely ready for sea in about two weeks. The torpedo boat McKee and the auxiliary torpedo boat destroyer Yankton were placed in commission from the same yard Tuesday.

Monthly pig iron statistics prepared by the Iron Age show that production is practically stationary at the rate of 1,000,000 tons per month, but there is some accumulation of stocks by the furnaces which are not connected with the large steel works. This tendency, however, is irregular, geographically, some sections showing a decline in stocks while others are accumulating iron.

Worthington C. Ford, chief of the bureau of statistics, treasury department, was by far the most competent officer that has held that responsible position, and his retirement is greatly regretted. It is unfortunate that a change should be made in this office, especially in view of the interest that has been shown of late by merchants and manufacturers in the reports of the bureau.

The torpedo boat Manley, purchased by the government from the Yarrow company in England and brought to New York on a freight steamer, has been relegated to dispatch service, as it has been found that her coal capacity is so limited that she cannot safely venture to sea, and owing to her peculiar construction the naval service torpedo tubes cannot be placed in her without extensive alterations.

In all the lake ship yards work on new vessels has been delayed during the past few weeks on account of the steel mills being crowded with rush orders from the government for material that is going into new naval vessels, and also into a large number of auxiliary vessels that have been bought of late and are being fitted for war purposes.

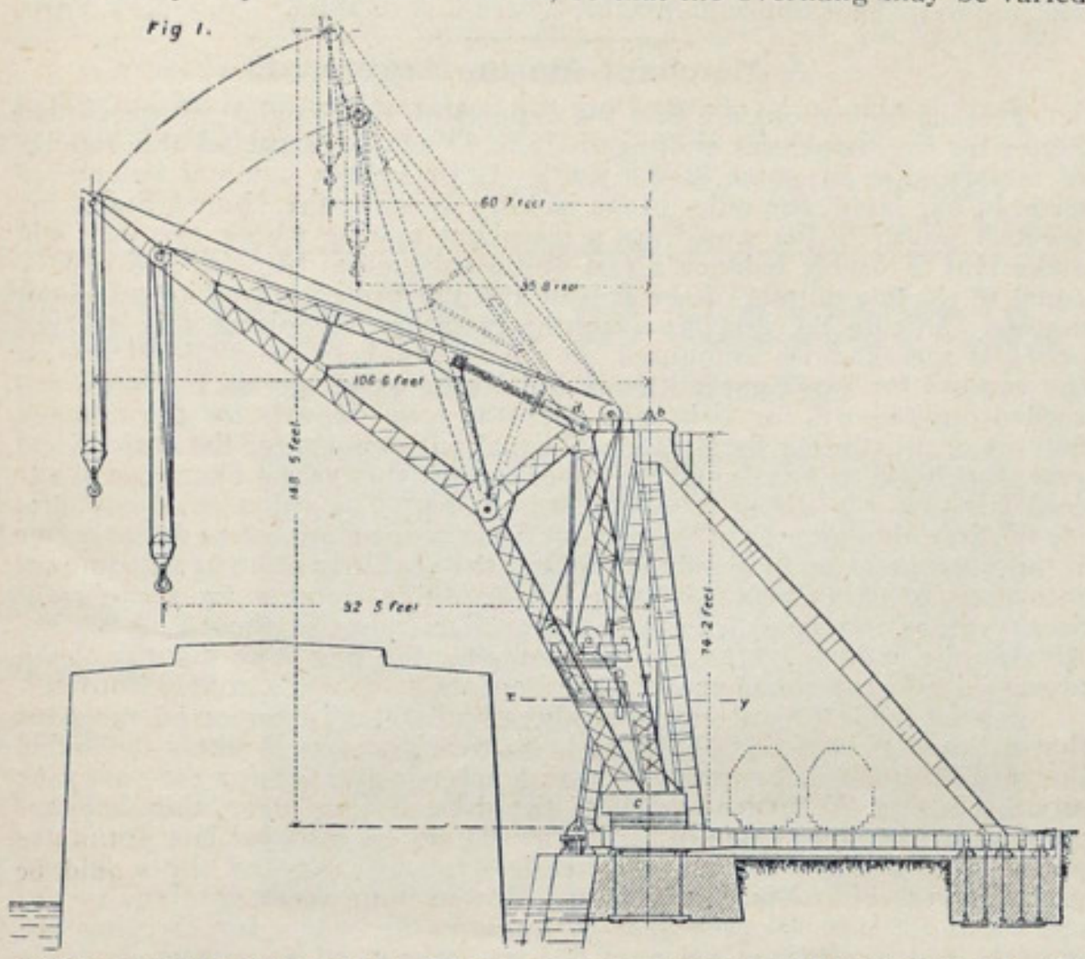
Secretary Long of the navy has assigned to Boston the one concrete dry dock authorized by the naval appropriation bill. The Boston dock will cost, therefore, $1,000,000, as against $825,000 each for the timber docks at Portsmouth, League island and Mare island.

Large Ship Yard Crane.

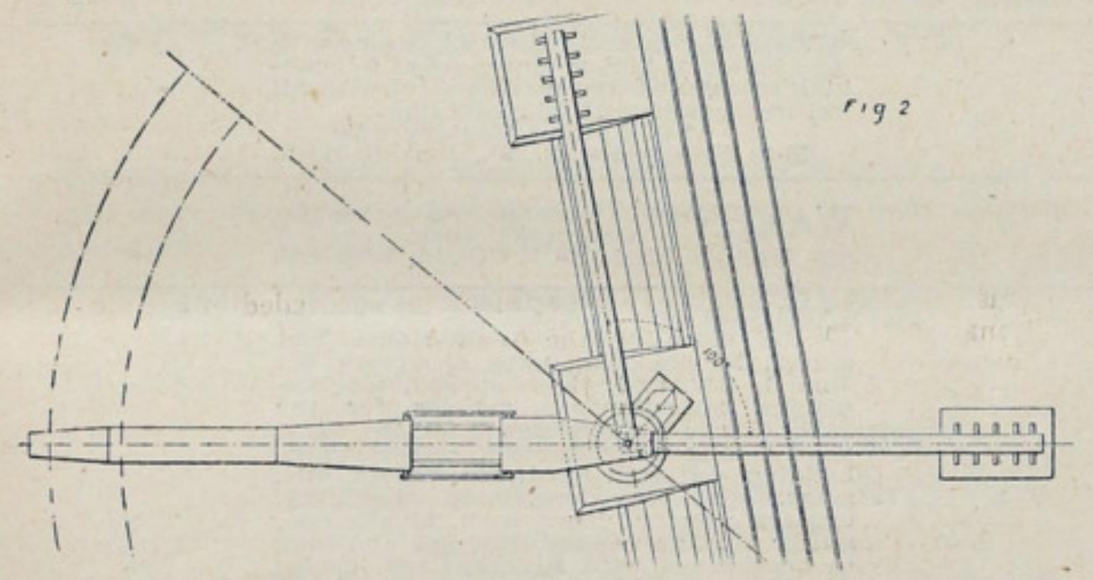
The ship yard crane illustrated herewith combines the advantages of shear legs with that of a radial traversing crane. The crane is intended for hoisting boilers and other heavy weights in the equipment of vessels. It has been in use at the works of Messrs. Blohome & Voss, Hamburg, for several months past and gives entire satisfaction. The drawings are reproduced from the Engineer of London.

As will be seen from the figure, the jib is hinged at A, and can be drawn in by a system of screws at D, so that the overhang may be varied

Fig 1.



within considerable limits. There are two systems of hoisting tackle, the outer one having a fourfold purchase, being intended for loads up to a maximum of 30 tons, and the inner one, which is of eightfold purchase, taking up to 100 tons. The winding barrels, which are made of larger size than usual, are driven by a pair of reversing engines with cylinders 9½ inches diameter and 17.6 inches stroke, making 180 revolutions per minute, the lifting speed being: On the larger tackle, with 50 tons load, 8½ feet per minute; 50 to 100 tons, 4¼ feet per minute; smaller, with loads to 10 tons, 39.3 feet per minute; from 10 to 30 tons, 13.1 feet per minute. The working tests were made with loads of 45 and 150 tons respectively. The wire rope has a guaranteed strength of 100 tons, and winds on a single barrel for the smaller load, but for the larger one it is doubled, each



one winding independently. The overhang of the jib may be varied between 60 feet and 106 feet, measured from the central axis of rotation, which is about 8 feet back from the quay side, so that the effective command is little less than 100 feet. The screws for varying the pitch and the radial traversing motions are commanded by a pair of engines 88 inches by 11½ inches placed at X. Y., the latter movement being effected at the speed of 98.5 per minute, with the jib at its greatest overhang, with the engines making 180 revolutions. The foot being run on a circular plate, like that of a planing machine, and the lubricating being very carefully attended to, the frictional resistance is much smaller than was expected. The space at command was not considered to be sufficient to adopt ball or roller bearings.

In view of the interest attending everything pertaining to the United States navy just now, the special naval issue of the Scientific American Supplement is a very valuable number of that publication. This number of the Supplement was prepared with great care, and every effort made to make it as complete and accurate as possible. The work includes a brief history of the navy between the years 1883-1898, with the authorizations up to date. The method of classifying the various types of war vessels is explained, and a full description is given of all the principal war vessels under the following main heads: Battleships, cruisers, monitors, gun-boats, torpedo boats, etc. Valuable tables of statistics are also given, and a colored map of Cuba.

Charts of Georgian bay will be required by most of the captains of vessels of the medium class during the present season, on account of the increasing traffic in that direction. The Marine Review has in stock at all times the best charts of Georgian bay that are made.

Lights at Parry Sound and Toronto.

Recent notices from the Canadian department of Marine and fisheries, relating to lights in the main channel at Parry sound and at the entrance to Toronto harbor, are of special interest. The following sailing directions are given for Parry Sound:

"A vessel entering Parry Sound after passing the 15-foot spot off Hooper island should either return to the Jones island—Gordon rock range or bring the above range on bearing S. E. by E. to pass through the Gordon rock channel. Keep this on until the lights on Harold point are seen clear of the south-east point of Nias island, when haul up for Hugh rock light bearing E. ¼ N. until the lights on Harold point come in line bearing N. E. by E. ¾ E. Keep them exactly on until abreast of Cameron island when proceed as in past seasons. If leaving Parry Sound, before passing Cameron island, see that the Harold point range is exactly on bearing N. E. by E. ¾ E. Keep it so until between Hugh and Gordon rocks when haul up for Gordon rock bearing W. ¼ N. until the Lyon rock range comes on to lead through Gordon rock channel bearing S. E. by E. Steer on this range (Red rock light should be seen a little on the port bow) until the Jones island—Gordon rock range comes on, when haul over for Twin rocks for a short time to avoid the 15-foot spot off Hooper island. When Pancake island comes abreast (it can generally be made out even on a dark night) a vessel will be abreast of the shoal and may haul over to get the range on again, and she must keep it so."

Temporary range lights in the Parry Sound channels are located as follows: On the western Lyon rock has been erected a whitewashed pyramidal beacon which from a height of 20 feet above the water exhibits a fixed white light visible in the line of the range towards Gordon rock channel 6 miles. On the south end of the large heavily timbered island next north-east of Knightsleigh island has been erected a similar beacon, which also from a height of 20 feet above the water exhibits a fixed white light visible in the line of range 6 miles. These two lights in one bearing S. E. by E. lead through the channel at Gordon rock in 5 fathoms least water. On the south-east side of Harold point (Kill Bear point) has also been erected a whitewashed pyramidal beacon surmounted by a pole which from a height of 25 feet above the water exhibits a fixed white light visible in the line of range 8 miles. On the main land 1,300 feet N. E. by E. ¾ E. from the front light is erected an exactly similar beacon and pole which from a height of 50 feet above the water exhibits a fixed white light visible in the line of range 8 miles. These two beacons and lights in one bearing N. E. by E. ¾ E. lead fairly between Nias islands and Carling rock on the north-west and Rose island, Hugh rock and Cameron island on the south-east. In passing through the channel the range should be held exactly on to lead past a rock with 19 feet water on it (black buoy) lying east 2,000 feet from the east side of Nias island and also to lead past a rock with 16 feet water on it (red flag buoy) lying W. by S. ¾ S. 2,000 feet from Cameron island beacon. These rocks lie only 50 yards off the line of range, one on each side.

The small column fixed red light hitherto maintained on the outer edge of the east pier, Toronto, has been moved N. W. by N. 2400 feet and now stands on the inner end of the pier, forming with the new front tower which has been erected on its former position a range showing the line of the pier. The light is, as heretofore, fixed red, elevated 18 feet above the lake level and can be seen from all points of approach from the bay. The new skeleton tower stands on the position formerly occupied by the column light. The new light is occulting red, bright 6 seconds with intervals of darkness of 6 seconds. It is elevated 43 feet above lake level, and should be seen in clear weather at a distance of 8 miles, over an arc of 180° from N. N. E. around to S. S. W. The apparatus is dioptric of the sixth order.

A chart of the Eastern portion of the Bay of Quinté, from Kingston to Deseronto, prepared from a survey of the chief engineer of the department of marine and fisheries, has lately been published by the British Admiralty. Copies of the same may be obtained from the Marine Review.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, May 14, 1898:

	Wheat, bushels.	Corn, bushels.
Chicago	2,831,000	7,620,000
Duluth	3,112,000	2,267,000
Milwaukee	143,000	.....
Detroit	67,000	187,000
Toledo	376,000	499,000
Buffalo	1,532,000	1,220,000
	8,061,000	11,793,000

As compared with a week ago, the above figures show, at the several points named, an increase of 354,000 bushels of wheat and a decrease of 2,107,000 bushels of corn.

Tonnage of New Vessels.

Official numbers and tonnage of lake vessels newly entered on government registers in the office of the United States commissioner of navigation are as follows: Steam vessels—Orinoco, West Bay City, 2226.03 tons gross and 1928.83 net, No. 155,317; Isaac Lincoln, Sandusky, 376.77 gross, 250.33 net, No. 100,653; Harvey D. Goulder, Cleveland, 156.65 gross, 78.33 net, No. 96,399; Marion, Marquette, 63.24 gross, 43.01 net, No. 92,852; William H., Ashtabula, 38.56 gross, 26.23 net, No. 81,600. Sailing vessels—David Z. Norton, Cleveland, 3,250.94 gross, 2,926,19 net, No. 157,506; Silver Chief, Grand Haven, 10.06 gross, 10.06 net, No. 116,810.

Chas. P. Willard & Co. of Chicago report that they are favored with an extensive marine trade this year. This week they are shipping a boiler and engine to Japan, to be used on a launch in the harbor of Yokohama. Willard & Co. furnished the plans for this boat. The hull will be built in Yokohama.

It is said that the government paid only $170,000 for the Cruiser Topeka, purchased in England. Her building was contracted for at a cost of $350,000.

Trade Notes.

The manager of one of the leading ship chandlery concerns on the lakes said recently: "When you purchase graphite in any form from the Dixon Crucible Co. you may depend upon it that you are getting genuine graphite without any mixture unless it is so stated. As fast as marine engineers try it they tie to it for lubricating purposes."

The steambarge J. H. Pauly received a new MacKinnon wheel at the slings of the MacKinnon Mfg. Co., Bay City, last week. The Petrel, Geyser and Maud S. were also in the slings for repairs and new wheels. This company has recently shipped several propellor wheels to different parts of the United States. Their apparatus for hoisting boats out of the water saves expense and time.

It requires eight catalogue pages to give a list of steamers fitted with the Foster new class W pressure regulators. A large number of them are warships and other government vessels. The requirements of a pressure regulator on a war-ship are very severe, and on some of them there are from forty to fifty of these Foster valves. The three revenue cutters built by the Globe Iron Works Co., Cleveland, and the principal steamers of the American Steel Barge Co.'s fleet are fitted with these valves.

The demand for a high speed engine, giving the greatest horse power with the least weight and floor space, has been met by the B. F. Sturtevant Co. As a proof that it is not a fancied long-felt want it may be mentioned that they have sold some 6,000 engines of this class already. They are used largely for electric lighting and are furnished in direct-connected sets when required. Their double enclosed upright engine and bi-polar upright dynamo are compact and nicely proportioned. Catalogue No. 3 gives particulars and illustrates the different styles of engines.

A wooden coal barge of 1700 tons capacity has just been completed at the works of Kelley, Spear & Co., Bath, Me., for the Staples Coal Co. of Taunton, Mass. A sea-going tug for this company, the Eureka, building at the Hillman ship yard, Philadelphia, is also about ready for service. This tug is 138 feet long, and will take the place of the Winthrop, recently sold to the government. It is understood that two more tugs are to be built at the same yard for the Staples company. These vessels are used in the coal business between Philadelphia and New England ports.

A new power station and car house being erected by the Spencer, Warren & Brookfield Street Railway Co. at Brookfield, Mass., will have steel roof trusses and covering furnished by the Berlin Iron Bridge Co. of East Berlin, Conn. The dynamo and engine room roofs of this building will be lined with the Berlin company's patent anti-condensation roof lining, which is now almost universally used for roofs of this nature throughout the country. It prevents the condensation of moisture from the underside of the roof covering, which, if it should collect and drop upon the machinery beneath, would cause considerable damage.

Fireproof Woodwork for Warships.

One result of the fight in Manila bay will be to renew the effort to secure for warships interior fittings that are not in danger of catching fire from the explosion of hostile shells. In the burning of the two principal Spanish ships, the Reina Maria Cristina and the Castillo, we have a repetition of the lesson taught by the battle of the Yalu, where several ships were set on fire by shells. At that time Secretary Herbert was so impressed with the importance of securing fireproof woodwork for our ships that he discussed the subject at length in his annual report, and appointed a board, consisting of a line officer and two naval constructors, to investigate the subject. This board recommended the substitution of iron for wood in bulkheads and ladders, and also thought that some non-inflammable substitute for wood might be used for ceilings, furniture, berths, and so on. Then came a further step in the fireproofing of wood, a patented process, and its introduction into some of our ships then building. Of that device high hopes were entertained. The sap of the wood was extracted in vacuum, and then a certain composition was forced into the pores. But even this promising material did not give complete satisfaction. There were drawbacks, one being the alleged absorption of moisture, and, if we do not mistake, this prepared wood was not used in our later vessels.

The problem is a difficult one. Woodwork for the inside of ships is usually more comfortable than metal, and especially because there is less dampness where it is used. But its dangers have always been apparent, and the use of cork paint on metal to prevent the accumulation of moisture was resorted to by us half a dozen years ago. Foreign countries have also studied the question carefully. There have been resorts to sheet iron and even to pasteboard, canvas, calico and a kind of linoleum as coverings for ceilings, cabin bulkheads and other parts of the ship where wood planking is otherwise used. Papier maché would not stand salt water, and one objection to corrugated iron was its tendency to shake.

In the battle of the Yalu a shell exploding on one Japanese ship set fire to the beautiful cabinetwork, and she had to be withdrawn from action, while Capt. McGiffen's experience in the burning Chen Yuen is well remembered. The burning up at Manila of the only two Spanish cruisers that ranked above third rates must have practically ended the resisting powers of the fleet. We shall doubtless see, therefore, renewed efforts to replace wood on shipboard by other substances, as far as possible, and to make it non-inflammable where it is retained.—Sun, New York.

A Merchant Marine Argument.

Present indications are that the exports of merchandise of the United States for the fiscal year ending on June 30 next will exceed the imports of merchandise by some $600,000,000. With such a colossal balance of trade in our favor, the only things lacking to make the United States the greatest power in the world are a merchant marine whose earnings will make that favorable balance a real and a substantial balance, and a navy equal to the magnitude of the nation and the protection of its merchant marine. During the first nine months of the present fiscal year our exports of merchandise amounted, in round numbers, to $924,000,000. If the exports for April exceed those for March as greatly as the latter exceeded our exports for February, then the total exports for the first ten months of the present fiscal year will equal our exports for the entire fiscal year, which ended last June. In other words, this year's exports will exceed last year's by about $200,000,000 in value. The value of our imports for the first nine months of the present fiscal year amounted to $455,000,000. If this average be maintained throughout the year, our imports will amount to a total of about $600,000,000, a falling off in imports for the present fiscal year, as compared with the previous fiscal year, of about $160,000,000. Already the exports of the United States for the first nine months of the present fiscal year have exceeded the imports by more than $470,000,000.

During the last fiscal year the value of merchandise exported exceeded that of imports by $286,263,144, and this year's excess is likely to double that of last year. If our exports maintain their average for the past nine months during the entire twelve of the present fiscal year, they will approximate to a total value of $1,200,000,000, an excess over last year's exports of $168,000,000. And last year's exports exceeded those of any previous year by millions of dollars. But so long as we continue to pay out about $300,000,000 each year to foreign shipowners for carrying our imports and exports as we now do, we must need an enormous trade balance in our favor to keep us on the credit side of the international ledger. By permitting foreign ships to monopolize our foreign transportation we continue to maintain the period of our commercial dependence upon Europe. And to the extent that we give our foreign carrying trade to our own ships, to just that extent we abridge the period of such commercial subjection.—New York Commercial.

Oak Point beach and other picnic groves on Nickel Plate road for church, Sunday school, societies, clubs and camping parties—Committees desiring special train service for Oak Point beach or other pleasure groves may secure information by calling on agents or addressing the general passenger agent, Nickel Plate road, Cleveland, O. 54—June 30

FOR SALE—6 x 6 duplex deck engine with boiler 45 inches diam., 6 feet 6 inches high submerged flue marine steel with all fixtures, in strictly first class order.
C. C. Wormer Machinery Co.,
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WANTED—One hundred iron workers for two weeks' work.
UNION DRY DOCK CO., Buffalo, N.Y.

SEALED proposals will be received at the office of the Light-House Engineer, Mobile, Ala., until 12 o'clock M., June 1, 1898, and then opened, for furnishing miscellaneous articles for the Light-House Establishment for the fiscal year ending June 30, 1899, consisting of building material, hardware, paints, oils, glass, etc., provisions, ship chandlery, cypress cisterns, doors, sash, blinds, etc., gutter pipe, galvanized iron pipe and fuel, in accordance with specifications, copies of which, with blank proposals and other information may be had upon application to A. N. Damrell, Lieut. Col. Corps of Engineers, U. S. A. June 1.

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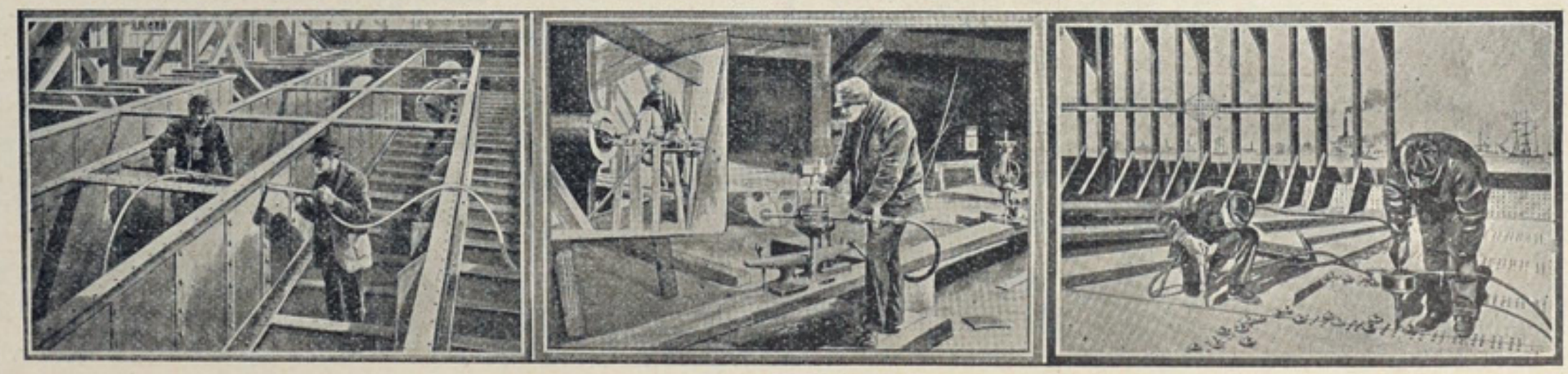

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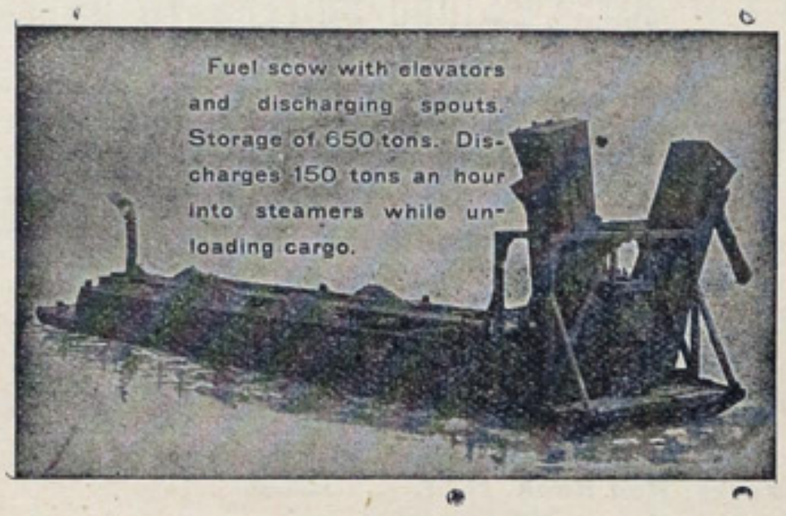
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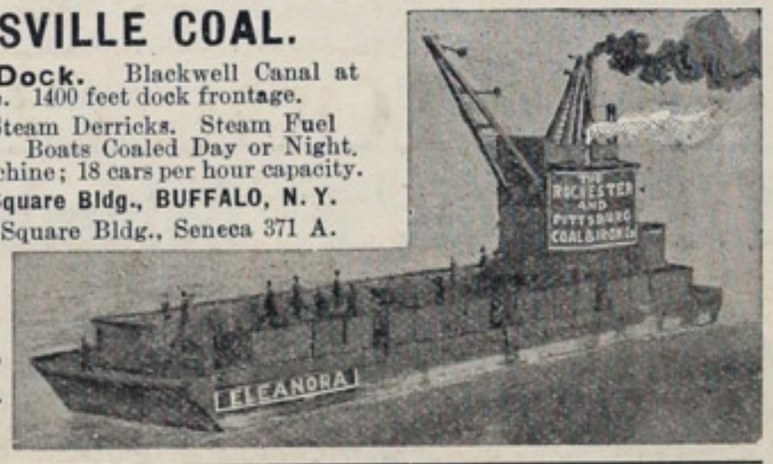

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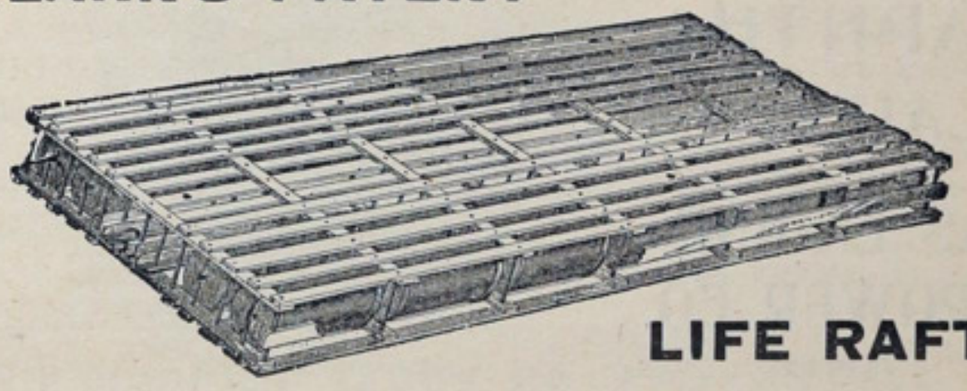

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SEALED PROPOSALS will be received at the office of the Light-House Engineer, Custom House, Mobile, Ala., until 2 o'clock P. M., May 26, 1898, and then opened, for metal work for Southwest Pass Light-Station, La., in accordance with specifications, copies of which, with blank proposals and other information, may be had upon application to A. N. Damrell, Lieut.Colonel, Corps of Engineers, U. S. A. June 1

NOTICE TO SHIP OWNERS AND SHIP BUILDERS.—Information furnished as to the strength of iron or steel vessels under different conditions, and the size and distribution of scantlings required in new vessels for different services, by a naval architect, who is an expert in this work. Address Box 452, Marine Review, Cleveland.

PROPOSALS FOR STEEL-HULLED STEAM TENDERS.—Mississippi River Commission, 2732 Pine st., St. Louis, Mo., April 27, 1898.—Sealed proposals, in triplicate, for furnishing five large steel-hulled steam tenders, complete with machinery and cabins, will be received here until 12 o'clock noon, standard time, May 27, 1898, and then publicly opened. Information furnished on application. H. E. WATERMAN, Capt., Eng'rs, Sec'y.
May 20.

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of appointments of Captains and Engineers for 1898 includes names of owners, captains and engineers of 1,000 of the principal lake vessels.

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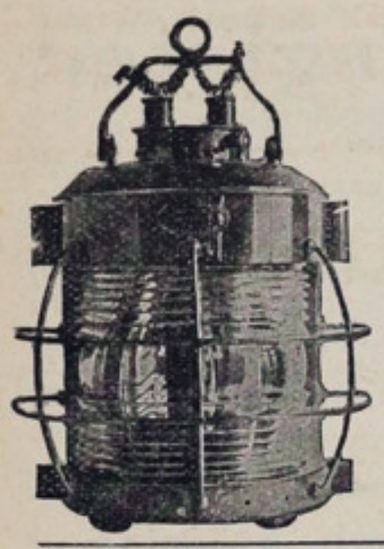

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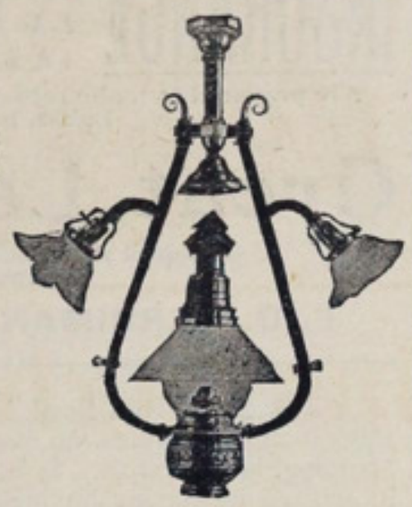

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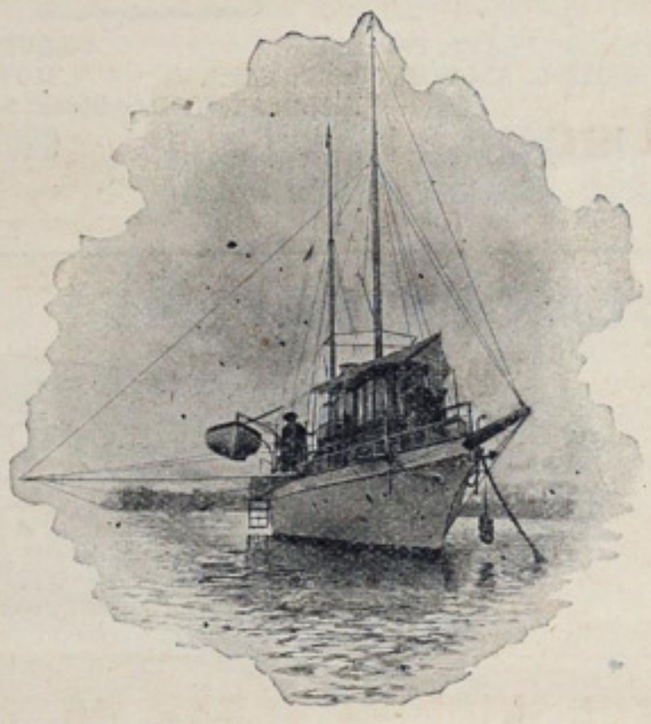

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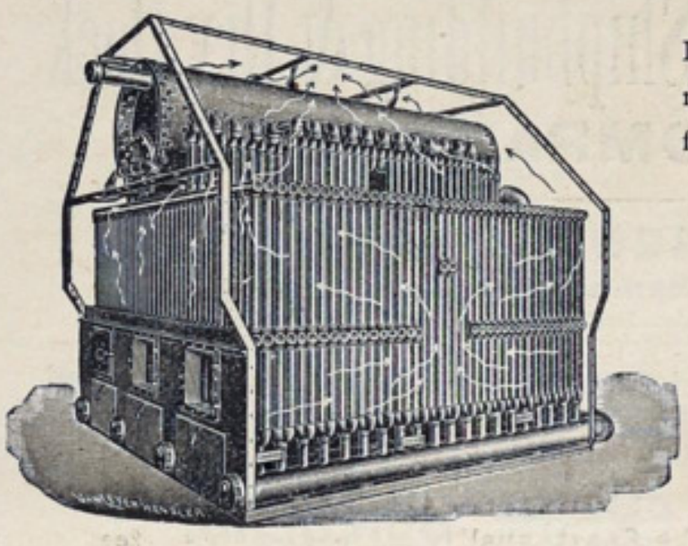

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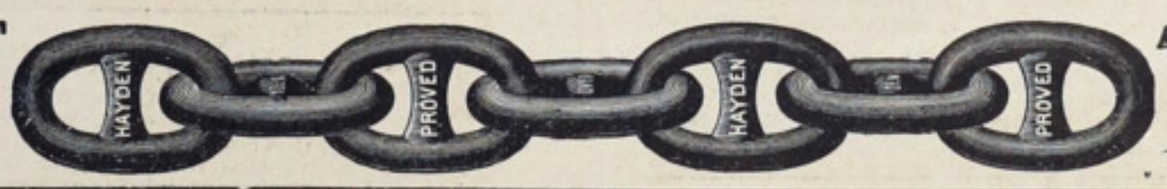

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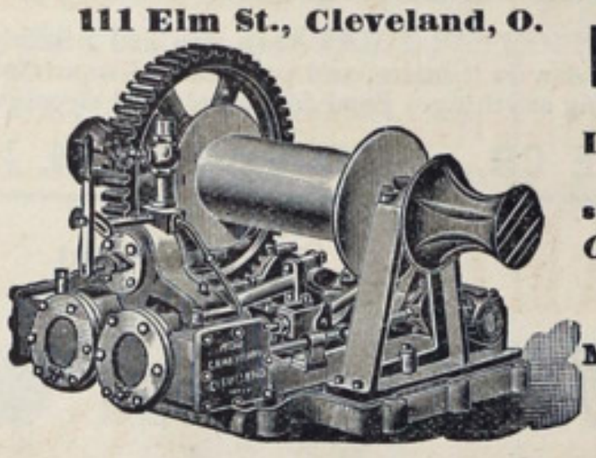

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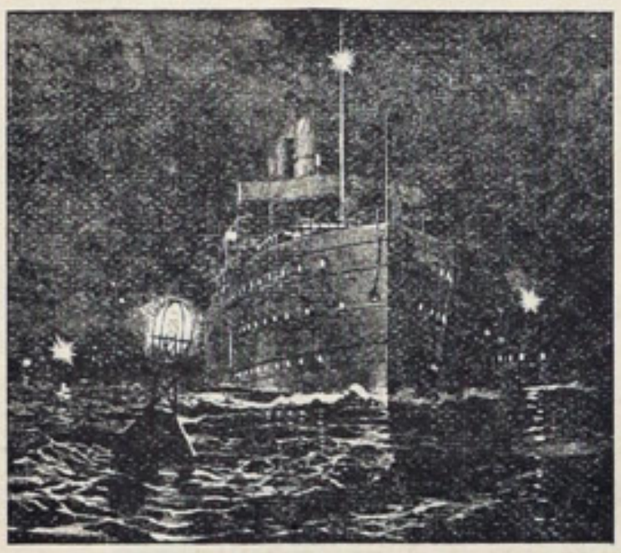

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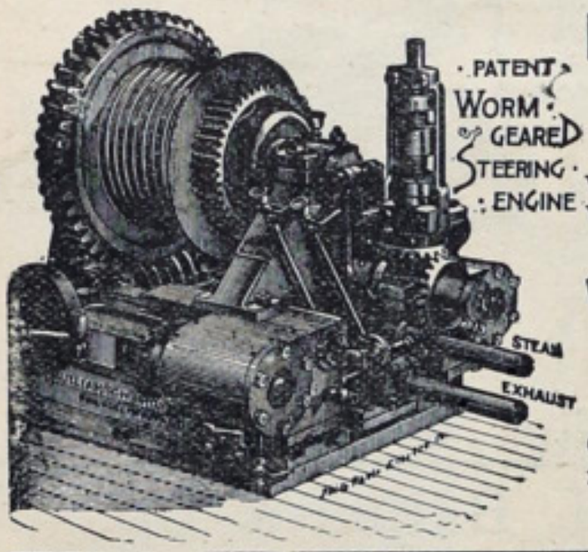

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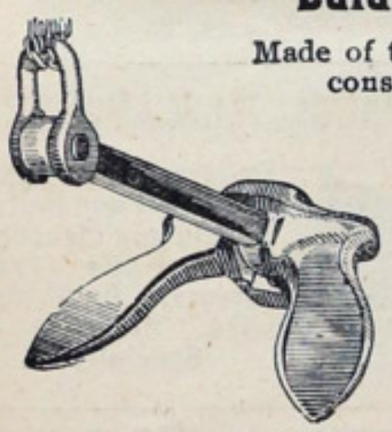

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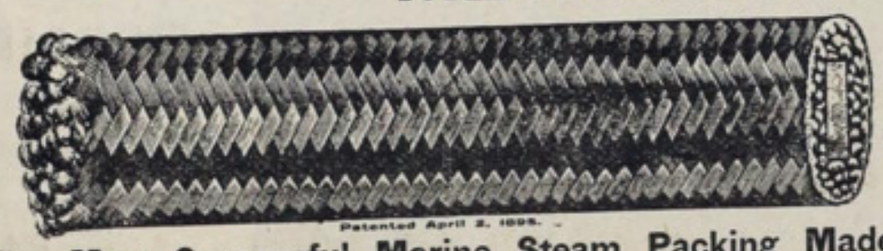

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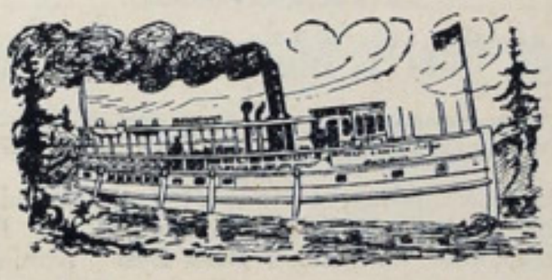

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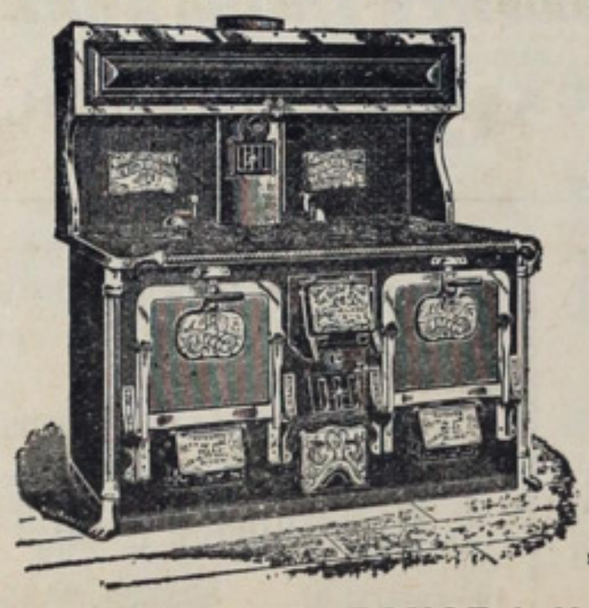

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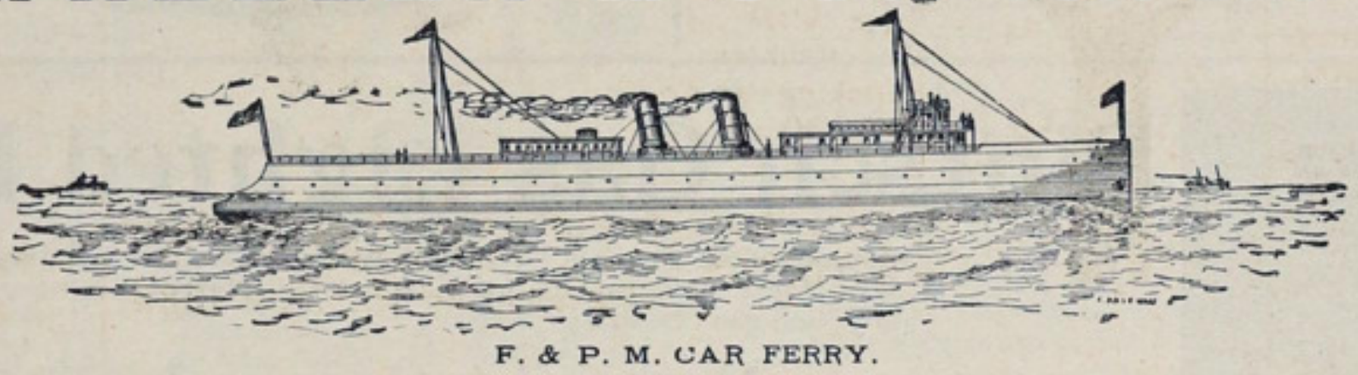

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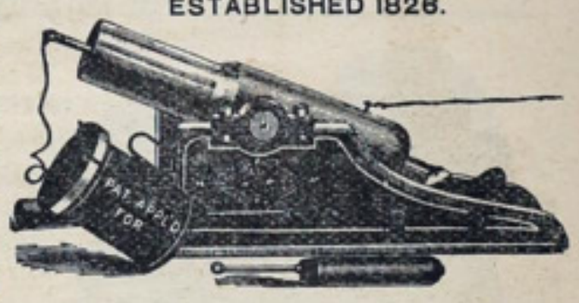

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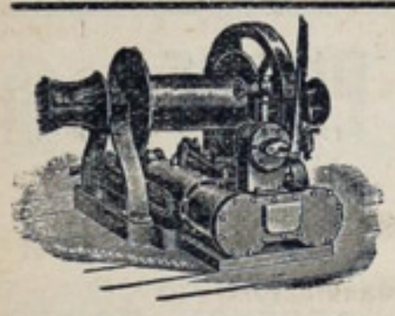

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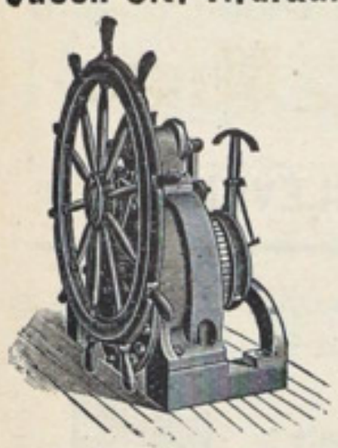

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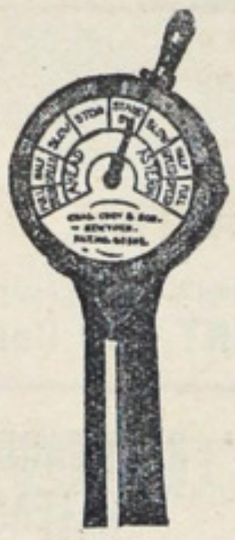

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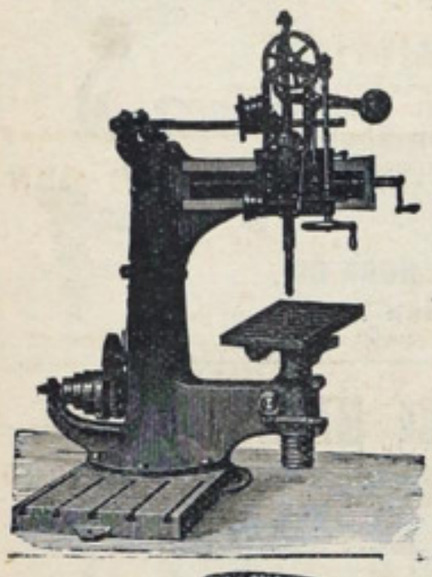

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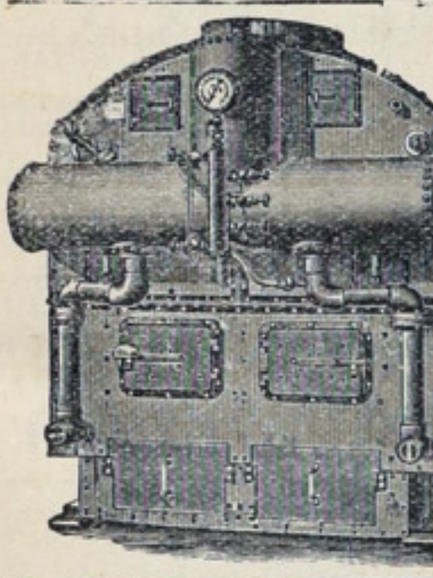

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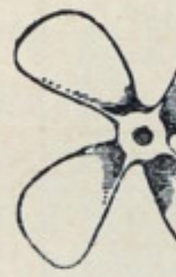

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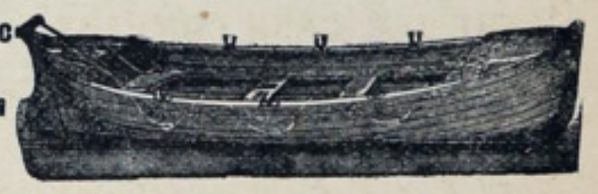

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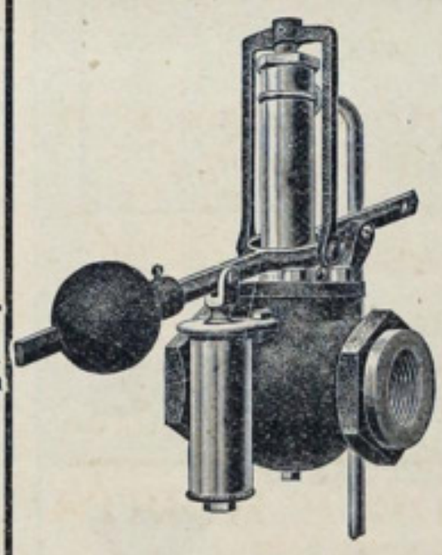

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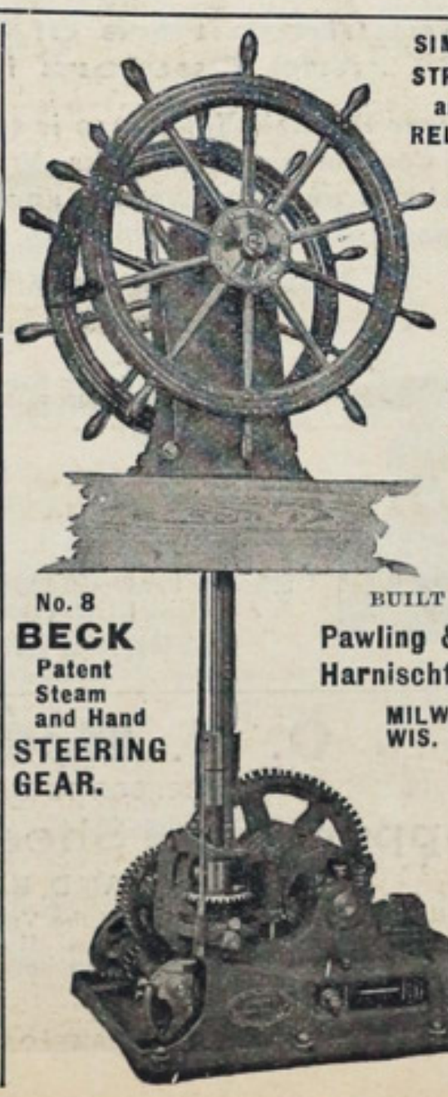

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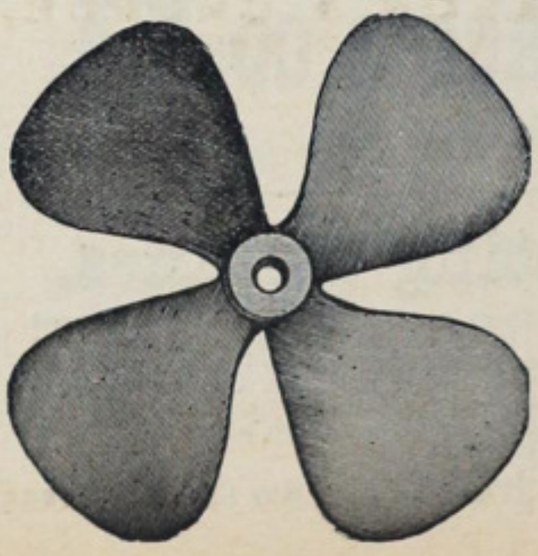

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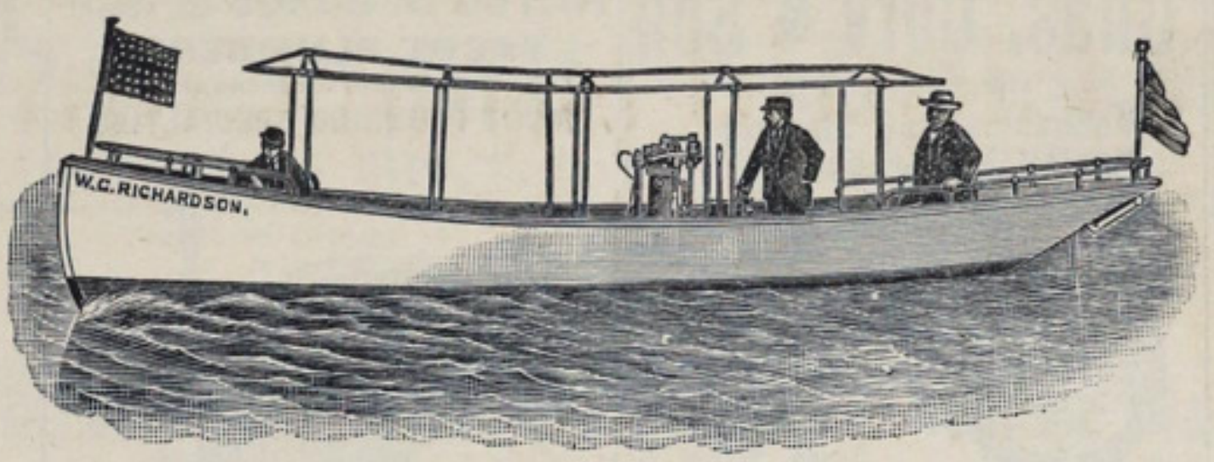

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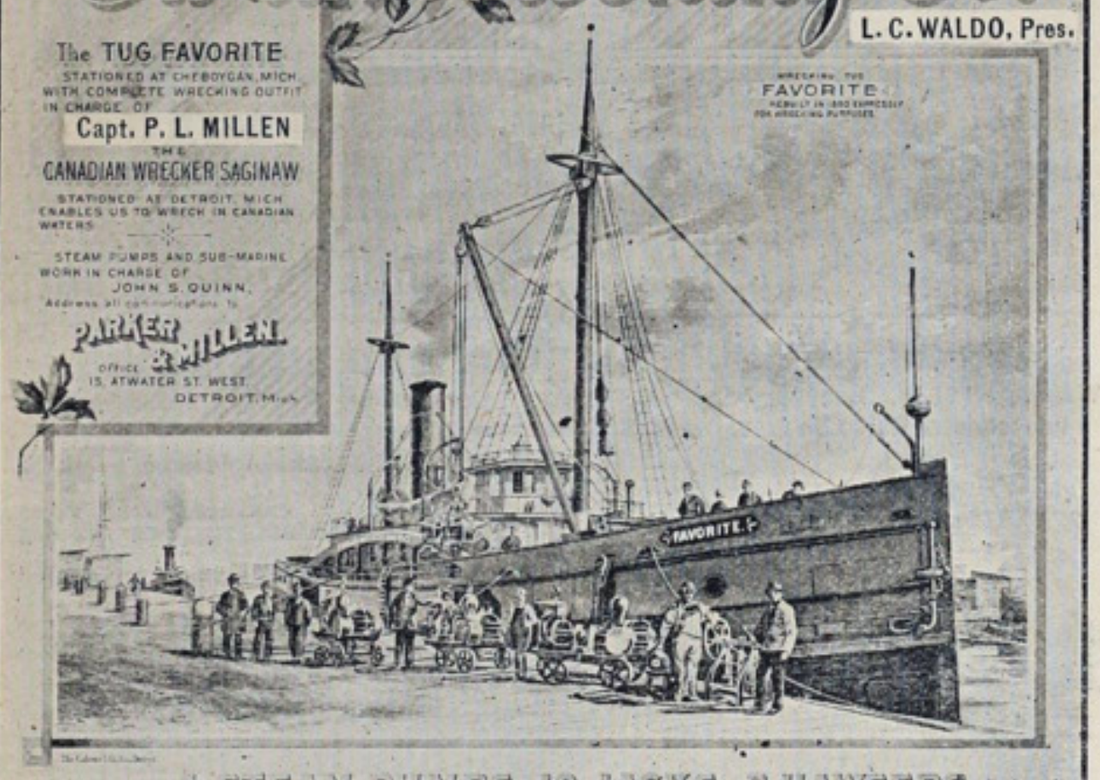

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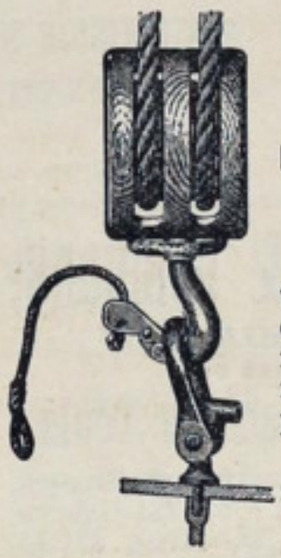

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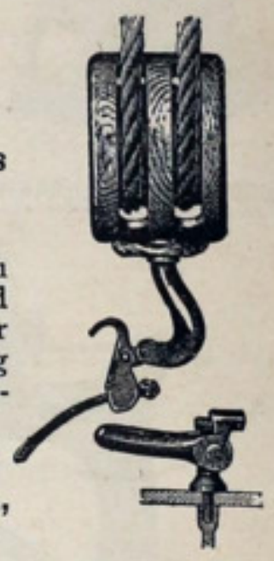

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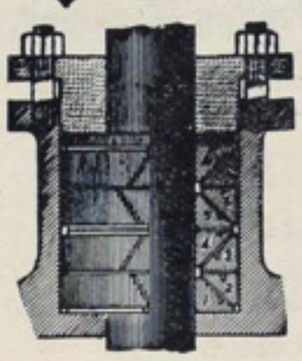

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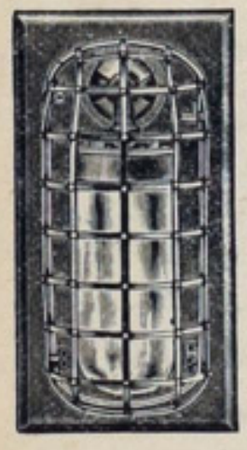

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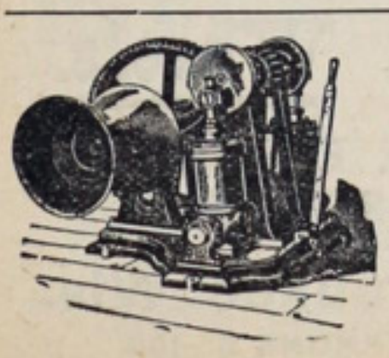

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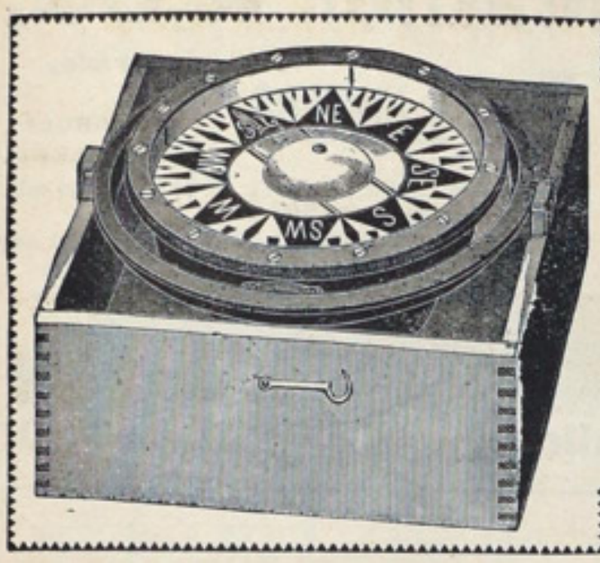

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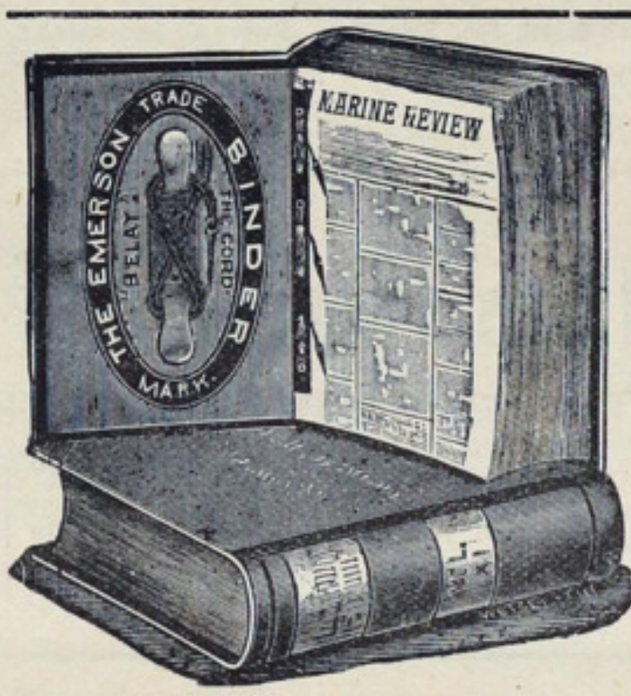

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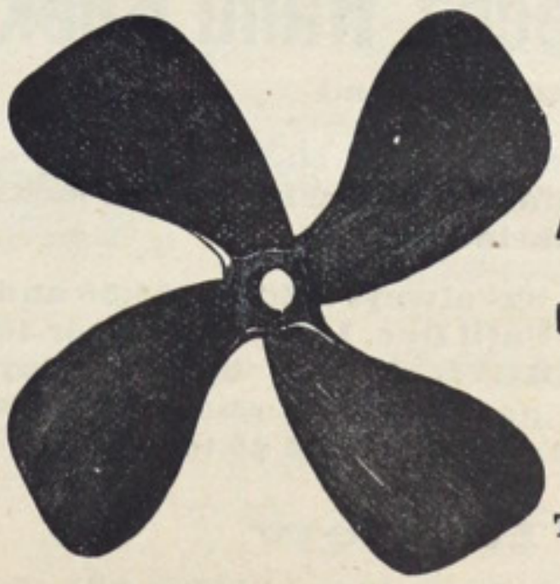

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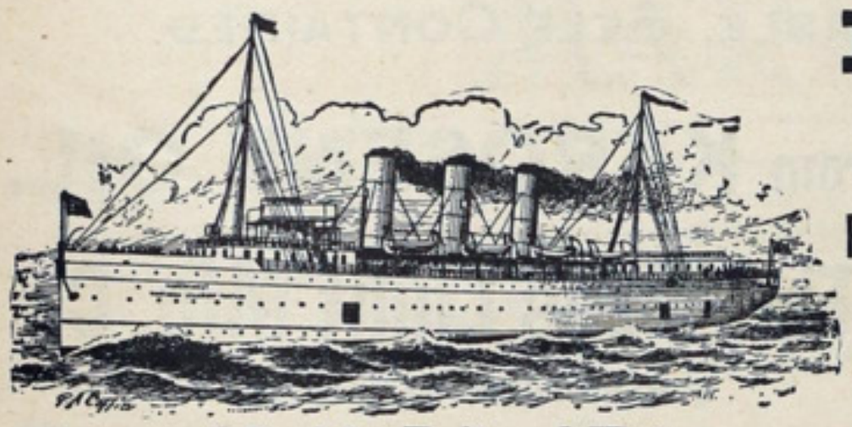

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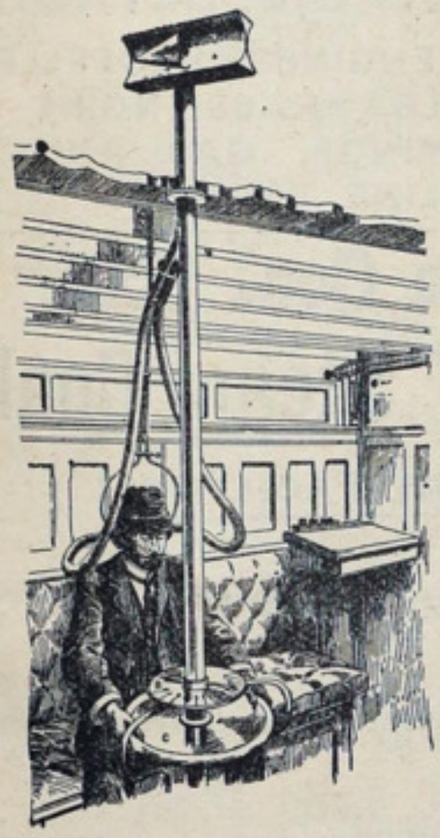

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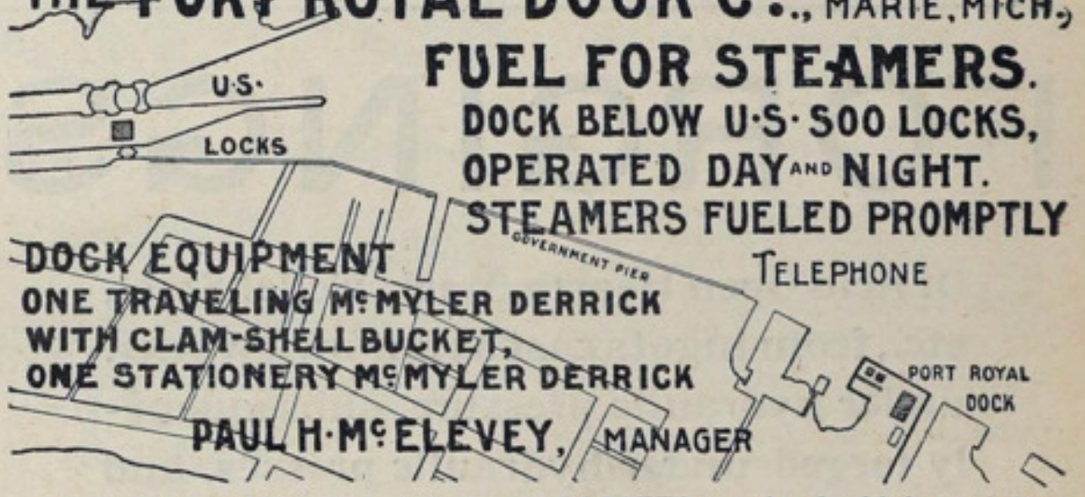

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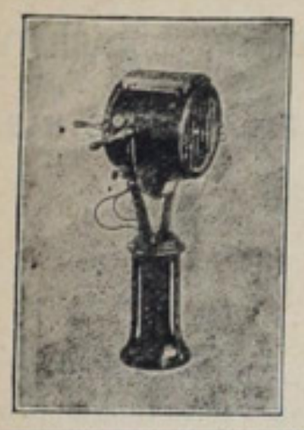

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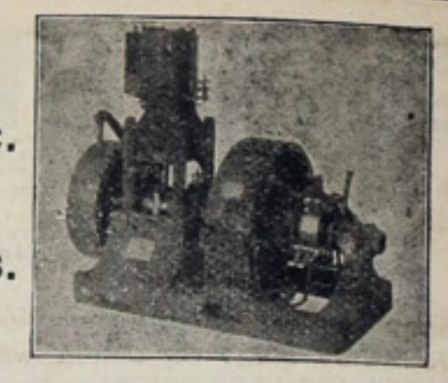

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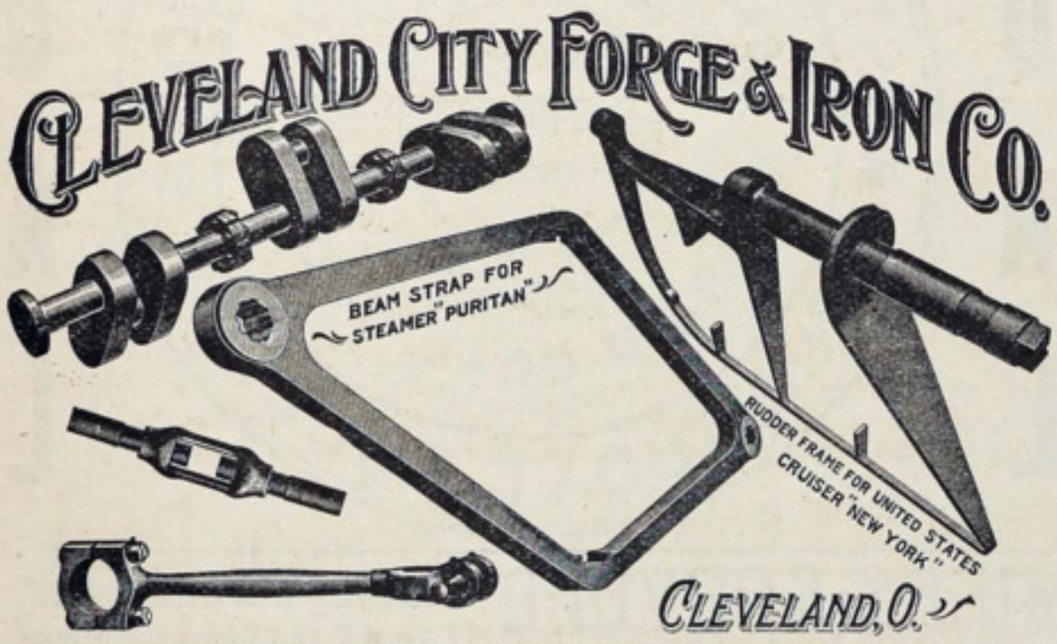

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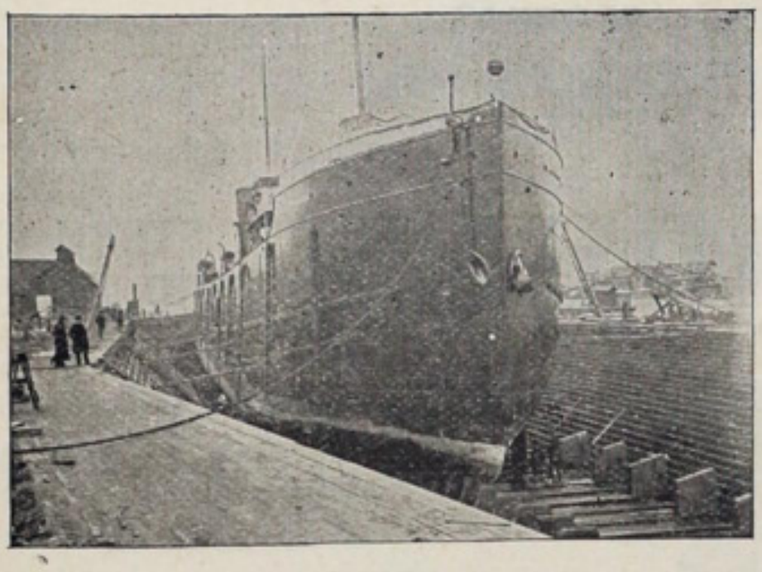

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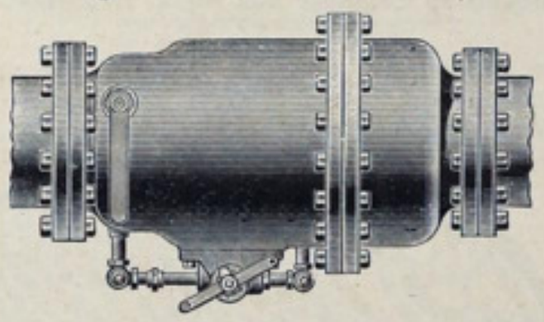

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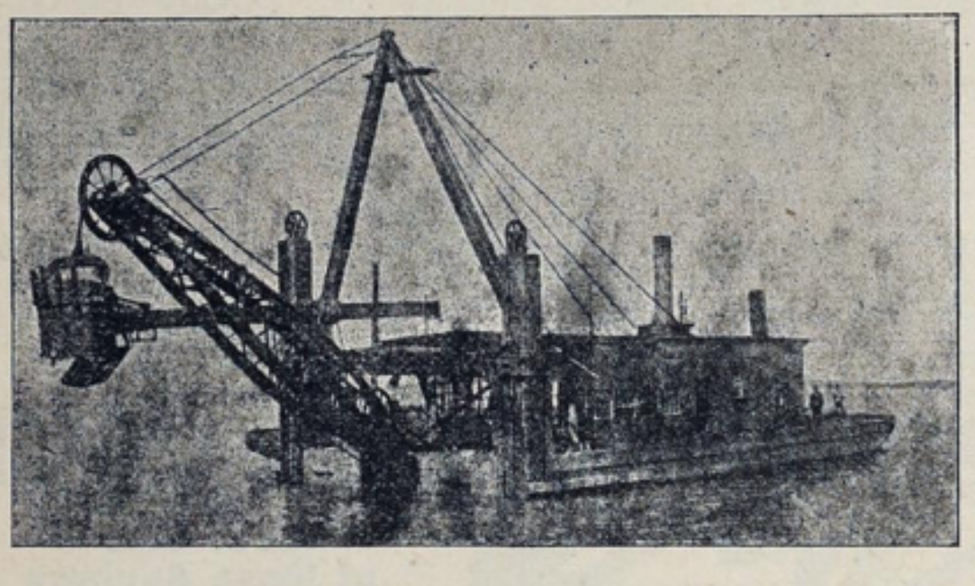

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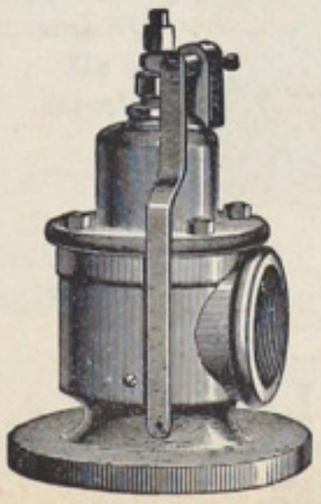

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